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ACCIDENTAL POISONING OF CHILDREN IN THE 1-4 AGE GROUP: AN EXPLORATORY STUDY

by

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A THESIS
SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH
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DEDICATION

To my husband, David and to my children, Wendy and Shawn, who supported me in the completion of the study.

ABSTRACT

This exploratory study was undertaken to describe environmental factors contributing to accidental poisoning of children 1 - 4 years of age and to examine the relationship between these factors and the developmental state of the children.

Two concepts and their interrelationships formed the conceptual framework for this study. They were the concept of child development and the concept of home environment provided by the family.

The subjects consisted of a convenience sample of 12 mother-child dyads who presented in the emergency department of a large university teaching hospital for treatment of accidental ingestion of poison. The study was carried out in the homes of the children who were accidentally poisoned.

Three tools, the Home Observation for Measurement of the Environment (Birth to Three), the Denver Developmental Screening Test and a questionnaire, were used to assess respectively: (1) the current environment in which the child was living; (2) the child's developmental status; and (3) various demographic, social and parental factors interacting within the life of the child.

Analysis of the data revealed the following: (1) various demographic differences including mother's age, mother's education, father's education, family income, father's presence and family size were detected among the sample of parents; (2) the sample of children had a preponderance of females, a high proportion of only children and children with one sibling, and a high incidence of repeat poisoning; (3) the majority of the poisonous substances ingested were drugs; (4)

the child's own home was the most common location of the poisoning accident; (5) the poisonous substances were too readily accessible to the children in over one-half of the accidents; (6) the majority of the poisoning episodes occurred at mealtimes; (7) parental knowledge of poisons was relatively high; (8) the children's HOME scores were significantly lower ($p < .01$) than the scores of an age appropriate normative sample of Edmonton children; and (9) the children were normal for development when compared to the standardization population.

The study findings suggest that the parents were in need of guidance to prevent poisonings in children. The home environments of the children were less than optimal, particularly in the following areas: the way the mother restricted and punished the child, organization of the environment, and absence of the father from the home and/or the extent of his involvement in the child's care. Further, the results suggest that nursing intervention should focus on providing families with information about growth and development, age-appropriate methods of discipline, and basic safety practices, as well as information about accidental poisoning. Based on the foregoing results, the researcher recommended that the present study be replicated and that the influence of social support on the occurrence of accidental poisoning was a particularly important area for further investigation.

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CHAPTER 1

STATEMENT OF THE PROBLEM

Introduction

Accidents are the leading cause of mortality in children in Canada and are second only to infections as a cause of morbidity (Tracy, 1981). At the 1st National Conference on Childhood Accidents and Prevention held in Ottawa in 1981, the Minister of Health and Welfare reported that accident rates for children and youth in Canada are higher than in most western countries (Begin, 1981). When considering the 18 most developed nations, Canada has the third worst record in the accidental death of 1-4 year old children (Begin, 1981).

Most poisonings in children occur between the ages of 1 and 4 (Braden, 1979; Craft & Sibert, 1977; Done, Jung, Wood & Klauber, 1971; Driggers, 1982; Keller, 1979; Lovejoy & Berenberg, 1978). The most recent statistic for Canada indicates that in 1977, 2,438 children in the 1-4 age group were admitted to hospitals in Alberta because of accidents (Tracy, 1981). Tracy points out that accidental poisonings rank second to falls as a reason for emergency admission and account for approximately 20 percent of hospital admissions.

Significance and Nature of the Study

Although the mortality from accidental poisonings has decreased, the frequency of accidental poisonings in the preschool age group has increased (Waldman, Mofenson & Greensher, 1976). A review of the medical literature revealed abundant information on the treatment of

childhood poisonings. Such treatment would be unnecessary if the accidental ingestion could be prevented. The magnitude and seriousness of the problem have prompted many studies, most of which have been conducted in an attempt to supply information on circumstances surrounding poisoning episodes that may have implications for prevention. Some studies have also isolated certain causal factors in the accidental poisoning of children (Buffoni, Reboa, Galletti, DeSantis & Tarateta, 1981; Craft, 1975; Jackson, Walker & Wynne, 1968; Scherz, 1970). These factors include a disrupted parent-child relationship, the time of day, relationship to meals and whether the product is in or out of sight. While some authors (Dershewitz & Christopherson, 1984; Shaw, 1977; Simon, 1982) cited developmental factors and factors in the home environment as causes of accidental poisoning in children, no studies were identified which investigated the relationship between poisoning and the developmental level of the child who ingests the poison, or the specific characteristics of the child's home environment.

The Problem and Research Objectives

The purpose of this study was to explore some of the possible environmental factors contributing to the accidental poisoning of children 1-4 years of age and to examine the relationship between these factors and the developmental state of the children who ingested the poison.

The specific research objectives were as follows:

1. To describe selected characteristics of a sample of parents and their children aged 1-4 years treated for accidental poisoining;

2. To describe selected characteristics of the poisonous substances ingested by the children and of the events surrounding the poisoning accident;

3. To examine parental knowledge about poisons;

4. To describe characteristics of the children's home environment in the areas of: (a) emotional and verbal responsivity of the mother, (b) avoidance of restriction and punishment, (c) organization of the physical and temporal environment, (d) provision of appropriate play material, (e) maternal involvement with the child and (f) opportunities for variety in daily stimulation;

5. To describe the developmental state of the children in four skill areas: (a) personal-social, (b) fine motor-adaptive, (c) language and (d) gross motor; and

6. To examine the relationship between the children's current home environment, their developmental status and selected demographic characteristics.

Need for the Study

"Like motherhood and apple pie, poison prevention is a concept everyone believes in . . ." (Williams, 1979, p. 21). The primary need for this investigation stemmed from the nurse's unique position in the health care system from which she has the opportunity to provide parents with anticipatory guidance in order to increase the wellness potential of their environment and reduce accidents (Clark, 1981). In the Lalonde Working Document (1974) convincing arguments are presented to indicate that further improvement in the health status of Canadians will depend more on healthy lifestyles and environmental improvements than on further advancements in medical treatment.

Although there is agreement that in many instances poisoning does not result in death, this result must not be taken to imply that poisonings in children are not serious (Illingworth, 1974; Jackson et al., 1968; Whaley & Wong, 1979). Morbidity and the sequelae of poisoning are considerable.

Firstly, "the child who has been poisoned is not just an organism but also a person who is part of a family" (Lybarger, 1977, p. 38). The poisoning episode and the circumstances that surround it have a great psychological effect on the parents. They often feel very anxious and guilty. In a study of accidental ingestion of poison in young children, Lewis, Solnit, Stark, Gabrielson and Klatskin (1966) found that this painful guilt frequently interfered with the parents' cooperation. This guilt would certainly be lessened if the parents were given the opportunity to verbalize their concerns and feelings to an understanding and non-judgmental nurse. Indirect costs, in terms of possible psychological and social costs (for example, decreased attention to siblings) cannot be ascertained.

Secondly, for a young child, induced emesis, gastric lavage or venipuncture, followed by hospital admission can be a very frightening and painful experience with psychological sequelae. The psychological effect of restraining a child for venipuncture or for administering ipecac can seriously threaten his security. In addition, transportation costs or the treatment costs generated for victims suffering permanent or long-term disabilities, such as esophageal stricture from lye ingestion, cannot be measured (Tracy, 1981).

Finally, the total cost of accidental poisoning to the health care system is unknown. There is great expenditure of time and money

as hospital facilities are often put under stress by the admission and treatment of patients who are poisoned (Illingworth, 1974; Thomson, Paterson & Morrison, 1980).

To enhance the nurse's position in delivering health care to the parents the nurse needs to have some knowledge of the factors that relate to accidental poisoning in children 1-4 years of age. A knowledge of these factors could serve to improve the anticipatory guidance given to parents regarding poisoning and serve to determine which parts of the environment are most likely to merit change to best meet the needs of the child based on his unique developmental requirements (Erickson, 1976).

Definition of Terms

The following definitions were adopted for use in the study.

1. Poison - Any product or substance which, when ingested, inhaled, or absorbed, is deemed capable of causing harm (that is, destroying life or impairing health).

2. Accidental Poisoning - The unintended ingestion, inhalation or contact with a potentially poisonous product or substance. The poisoning is unintended, in that, the victim is unaware of the potential hazard (Tracy, 1981).

3. Home Environment - The external forces within a child's familiar surroundings which are absorbed and processed by the child and which either foster or impede a child's growth and developmental processes. These forces are considered in two separate contexts and include the:

(a) Psycho-Social Environment - The available influences or conditions which promote social, emotional, and cognitive support for a

young child, within his home as measured by the Home Observation for Measurement of the Environment.

(b) Physical Environment - The accessibility and availability of poisonous substances in the child's home.

4. Developmental State - The abilities of the child in the areas of gross-motor, language, fine motor-adaptive, and personal-social skills, as measured by the Denver Developmental Screening Test.

Conceptual Framework

"The future of any society depends on its children" (Whaley & Wong, 1979, p. 20). Thus, if it is to survive, the society must make provision for their care, nurture and safety. Today in most cultures children are highly valued and coveted for themselves as valuable assets in the present, as well as for their potential for the future (Whaley & Wong, 1979). To optimize the health care of each child, nurses must consider the child's developmental state together with environmental factors.

Two concepts and their interrelationships form the conceptual framework for this study. They are the concept of child development and the concept of home environment, in particular, the psycho-social and physical environments provided by the family. This framework is applied in the specific example of accidental poisoning in young children in which these two concepts interrelate in an important way.

Development. "Children are born with inherited potentialities for intellectual growth, but they must develop into that potential through interaction with the environment" (Whaley & Wong, 1979, p. 68). The Swiss psychologist Jean Piaget has contributed most toward

the understanding of children's thinking (Engleharat, 1974; Phillips, 1969). He contended that intellectual or cognitive development comes in stages as the child develops biologically. Piaget believed that intelligence enables individuals to make adaptations to the environment that increase the probability of survival and that through their behaviour they establish and maintain an equilibrium with that environment (Phillips, 1969).

According to Piagetian theory, there are qualitative differences in the ways children think at different ages. As they mature, they build on the accomplishments of the previous stages in a continuous, orderly process. There are four major stages in the development of logical thinking. The first stage, known as the sensorimotor period, lasts from birth until about age two. This time span is broken into six chronological substages that are governed by sensations in which simple learning takes place. Children move from neonatal birth reflexes through simple repetitive behaviours to imitative behaviour. The task involved is mastery of coordinating simple sensorimotor activity. The main characteristic of this period is that the child's cognition derives from his motor and sensory experiences. He develops a sense of "cause-and-effect" as he directs behaviour toward objects and problem-solving at this age is primarily trial and error. The child displays a high level of curiosity. He works to create an organized environment that links his desires for physical satisfaction to his sensory experiences.

The second stage, the preoperational period, lasts from about age two to age seven. This period is characterized by egocentric thought. The child is unable to distinguish between his thoughts and perceptions

and those of others. The child's thinking is illogical by adult standards and dependent on observable phenomena. However, he is increasingly able to use language and symbols to represent objects in the environment.

Piaget's third and fourth stages of cognitive development, although important to the intellectual development of the individual, will not be discussed here as they do not apply to the age level of the children under investigation in this study.

Piaget's theory is useful for nurses because it enables them to better understand children's concepts about themselves, their environment and their experiences. Because parents are the primary socializing influence on the child and because the environment affecting the child can be modified, parents can be considered facilitators of the child's development (Engelhardt, 1974). Nurses can therefore provide parents with guidance in childrearing in order to help them optimize the intellectual development of their children. The child needs autonomy, encouragement and opportunities to explore and test his environment. The implications of Piaget's theory appear to be that the child should be actively involved in learning from his environment and that the parent can assist by giving the child freedom to explore and by facilitating his progression through the different developmental stages (Engelhardt, 1974).

The 1-4 year old age group, where the greatest number of accidental poisonings occur, is the age when children are inquisitive and do the most exploring in their home. All young children, particularly toddlers, are accident prone because of their developmental limitations (Katz, 1976; Lewis et al., 1966; Scherz,

1970; Simon, 1982). Because toddlers have received gratification through sucking and taste as infants, they are likely to continue to use this modality to explore their environment (Lybarger, 1977). The curiosity of the toddler seems insatiable. He continually searches the household for new and satisfying experiences. One can therefore see that curious toddlers, when they are able to open cabinets or cupboards, can become enthralled by all the brightly coloured containers. Children sampling these interesting boxes or bottles can be in for some tragic consequences, because often these containers hold deadly poisons. Young children lack the knowledge, experience and ability to understand the consequence of their action and may not be aware that certain products are dangerous.

Environment. In formulating a health assessment, it is not sufficient to look at the developmental status of the child as an isolated entity (Tudor, 1977; Wieczorek & Natapoff, 1981). Care should also be taken to examine the environmental factors that affect development because environment plays a significant role in the formative childhood years (Erickson, 1976; Yarrow, 1963). Yarrow (1963) points out that the individual never functions in a single environment, but operates in many overlapping contexts. The first environmental variable to consider is the quantity and quality of social, emotional and cognitive support available to a young child within his home. The child's environment may or may not be organized, predictable and nurturing, and may vary in the support it provides for his needs for consistency, trust, dependability and organization. An ideal environment will provide optimal amounts and timing of social, emotional and cognitive support for the child (Erickson, 1976). There

is evidence to suggest that toddlers are more likely to ingest poisons if they live in families characterized by parent-child relationships in the form of a power struggle and misdirected anger, and if they exhibit developmental characteristics of oral explorative behaviour, mimicry and negativism (Margolis, 1971). The constant vigilance that parents used while the child was an infant is decreased as the child develops and becomes a toddler. In addition, factors such as family stress can contribute to preoccupation of parents and decrease the attention paid to the child and his environment and subsequently increase the risk of accidental poisoning for the child (Sibert, 1975; Sobel, 1970).

The second major variable to consider is the number of physical conditions in a child's environment which contribute to poisoning, such as easy access to cleaning products. An unsafe environment is a potential risk to the young child's present and subsequent development. He lives in an environment designed primarily for adults (Tracy, 1981). Further, his environment is largely considered in the context of his family (Jones, 1980). As the young child lacks the knowledge and experience to successfully avoid the potential hazards which surround him, the responsibility to protect and educate him lies heavily with parents and all those who care for young children. The child tests the environment, learning the freedoms and constraints external to him and the limits and potentialities of his own capacities, and generally, parents encourage and socially support such testing (Yarrow, 1963). A desirable state of family organization is one that reflects the capacity of adults to organize the environment in a manner that helps the child to avoid danger (Lewis et al., 1966) at the same time as it permits sufficient gains in fine motor, gross

motor, personal-social and language skills that facilitate the child's development (Erickson, 1976).

In summary, the conceptual framework for this study was based on the premise that an increased understanding of accidental poisoning in young children required the consideration of the children's developmental stages and the characteristics of the home environment provided by the family.

Overview of the Study

This study is presented in five chapters. The first two chapters comprise the introduction and a review of relevant literature. Chapter 3 includes a description of the specific methodology, procedures and data analyses used in the study. The obtained results are detailed in Chapter 4. The final chapter contains the discussion of the results of the study, the conclusions, implications and recommendations.

CHAPTER 2

REVIEW OF THE LITERATURE

Introduction

Accidental poisoning in preschool children has been studied by a considerable number of researchers in the last few years (Eriksson, Larsson, Windbladh & Zetterstrom, 1979; Langley, Dodge & Silva, 1979; Rhone, Anderson & Stuart, 1983). The studies which have been done indicate that three main elements contribute to and help to differentiate the child who is accidentally poisoned. These three elements consist of: (1) the developmental characteristics of the child, (2) the organization of the home environment, and (3) other existing family conditions (Lewis et al., 1966; Rogers, 1981; Trudeau & Braden, 1978). Examples of these three elements include: (1) the degree to which a child is adventuresome and exploratory (Deeths & Breeden, 1971); (2) the availability of many potent drugs and cleaning materials in the home (Brink, 1981); and (3) poor parenting and poor family relationships (Jacob, 1981).

The literature indicates that the physical and psycho-social aspects of the environment are of critical importance for the young child in the availability as well as the organization of stimuli (Eyres, Barnard & Gray, 1979). The utilization of these stimuli depends upon the child's developmental state. Therefore, accidental poisoning in preschool children must be examined in terms of the developmental state of the child and the physical and psycho-social environments provided by the family. Literature pertaining to

accidental poisoning of preschool children is presented in two major sections: (1) developmental characteristics of the children, and (2) environmental factors that influence poisoning.

Developmental Characteristics of the Children

Young preschool children under the age of five years are more susceptible to accidental poisoning than children in any other age group. In all societies where studies have been done and statistics have been gathered, the 1-4 year old age group has been targeted as the population at risk (Buffoni et al., 1981; Langley et al., 1979; Mahdi, Taha & Rifai, 1983; Shaw, 1977; White, Driggers & Wardinsky, 1980). After the age of four years the incidence of accidental poisonings dropped dramatically as Table 2.1 (Tracy, 1981, p. 4) demonstrates:

Table 2.1

Accidental Poisonings as a Percentage of Total Reported Poisonings, Alberta, 1978

Age Group	Total Poisonings	Accidental Poisonings	Percent Accidental
0- 5	1,781	1,780	99.9
6-14	197	45	22.8
15-24	1,082	83	7.7
25-44	969	61	6.3
45-64	253	30	1.2
65+	32	10	31.3

Simon (1982) suggested that the increased risk for poisoning in the 1-4 age group was related to the child's level of physical and social development, as well as his active or passive participation in the environment. Children under one year of age are relatively immobile and exist in a controlled environment; once they begin to walk, however, their environment expands and they are more likely to discover substances that are poisonous. For purposes of this literature review, the focus is on identifying characteristics of the child who is accidentally poisoned. These characteristics include sex, age, family size, repeat poisonings and personality and behaviour.

Sex of the Children. Discrepancies in research results are apparent with reference to which sex of child is most likely to be accidentally poisoned. Some investigators reported a higher occurrence of poisonings in males than in females in the 1-4 age group (Allingham, 1975; Basavaraj & Forster, 1982; Buffoni et al., 1981; Deeths & Breeden, 1971; Gehlbach & Wall, 1977; Sobel, 1970). Deeths and Breeden (1971) offered the explanation that boys have greater resourcefulness in play, explore the environment more than girls, and thus are more likely to get into closets and cabinets where poisonous agents are often stored. Further, because boys have poorer motor control and have a tendency to learn motor control less rapidly than girls (Lewis et al., 1966), boys seem to remain in the creeper stage longer than girls and are therefore exposed to the dangers of poisonous substances stored at low levels for a longer period of time (Deeths & Breeden, 1971). However, other investigators reported no significant differences for the child's sex (Beautrais, Fergusson & Shannon, 1981; Craft & Sibert,

1977; Mahdi et al., 1983; Silva, Buckfield, Spears & Williams, 1978).

Age of the Children. Researchers who studied accidental poisoning in preschool children disagreed on the most susceptible age at which the maximum frequency of accidental poisioning occurred. In a one year study of accidental poisoning of children in an accident and emergency department in Ireland, Gill, Dargan and McDaid (1976) found that children between the ages of 1-3 years inclusive were at greatest risk. Similar findings were reported from studies conducted in the United States (Gehlbach & Wall, 1977) and in England (Hancock, 1973; Jackson et al., 1968). Buffoni et al. (1981) documented the maximum incidence in the second and third years of life, from the study of the epidemiological aspects of poisoning in children observed over a ten-year period in Italy. Valman (1982) agreed with these findings. Langley et al. (1979) in a five-year longitudinal study of child development, in New Zealand, collected data on all accidents during the first five years of life that required medical attention. They found that accidental poisonings peaked in the two-year age group. The peak incidence around two years of age has also been demonstrated by Allingham (1975). White et al. (1980) found that the peak age group was 1.5 to four years. However, Sobel (1970) found no significant difference with respect to the age of the child in the 1-4 age group.

Family Size of the Children. The question of family size as predictive of accidental poisoning in preschool children was also studied. Craft (1975) suggested that only children are less likely to be poisoned than those from large families because of the increased amount of supervision which parents are able to give them. This

suggestion was supported by the findings from surveys conducted by Allingham (1975) and Jackson et al. (1968), and from studies conducted by Basavaraj and Forster (1982) and Hancock (1973). Shaw (1977) interviewed 50 preschool children thought to have ingested potentially poisonous substances, together with 50 controls, and reported the tendency for poisoned children to come from larger families. However, Sobel (1970) reported no relationship between poisoning and the number of siblings.

Children with Repeated Poisonings. While many articles concerning accidental poisoning in children have been published in recent years, little has been written about those children who had repeated poisonings. In a study of 400 families, Sobel (1969) reported 88 cases of single ingestors and 26 cases of repeated ingestors. Waldman et al. (1976) reported that 59 percent of the calls to a Poison Control Center for first aid information involved the same children. According to their statistics, once a child had swallowed poison, there was a strong likelihood that he would be likely to ingest a further poisonous substance within a year. However, Allingham (1975) and Jones (1980) indicated that the incidence of repeat poisonings was very low (approximately 6 percent). Sobel (1970) found that the higher incidence of poisonings in males was limited to repeators, there being no difference between single ingestors and those who were never poisoned.

Personality and Behavioural Characteristics of the Children. Eriksson et al. (1979) reported on a study that showed that a higher proportion of children in a group of children who had been accidentally poisoned were considered to be more active than children in a control

group. This finding is in agreement with several studies in which unselected groups of poisoned children were classified according to their parents' opinion of behaviour (Baltimore & Meyer, 1969; Sibert & Newcombe, 1977; Sobel, 1970). In addition, Eriksson et al. (1979) reported that 50 to 60 percent of the parents of poisoned children under-estimated the child's ability to obtain poisonous products.

Sibert and Newcombe (1977) compared the personality and development of 105 children under five years of age admitted to hospital having ingested poisons, with 105 controls. They reported that poisoned children displayed some personality trends, in particular hyperactivity and anxiety, more often than controls. Poisoned children caused more worry to their parents. They also put substances other than food into their mouths more frequently than did controls. It is noteworthy that there was significantly more hyperactivity in the patients than in the controls in both Sobel's (1970) and Margolis' (1971) studies. The findings of Basavaraj and Forster (1982) agreed with Sibert and Newcombe (1977) with respect to children under five years of age putting things other than food in their mouths.

Simon (1982) noted that the young child is prone to ingest some potential toxins because his primary method of sampling is tasting. Many tablets and capsules are similar in size, shape, and colour to certain types of candies (Craft, 1975). Thus, it is easy to see why a child would eat such medicines. In fact, Simon (1982) stated that parents might call medicines "candy" to induce children to take them.

Environmental Factors that Influence Poisoning

Researchers who have conducted studies with preschool children who were accidentally poisoned have generally concluded that a number of environmental factors in the home interrelated with the characteristics of the children to result in poisoning. For purposes of this literature review, the home environment is considered in two separate contexts: (1) physical, and (2) psycho-social.

Physical Environment. A number of investigators have found that certain characteristics of the physical environment were significantly related to families of poisoned and not to non-poisoned children. Researchers have found that the types of substances involved in poisonings, the types of containers containing the poisonous substances, the location of the accident, and the time of day and day of the week of the accident were all important considerations in any poisoning accident.

Mofenson and Greensher (1970) estimated that there were 250 potentially poisonous products in the average home and the number of hazardous products on the market increased yearly. Buffoni et al. (1981) documented drugs (pharmaceutical preparations) as the most common agents of poisoning in children, followed by household products (including hydrocarbons), and thirdly, a composite group consisting of cosmetics, alcohol, berries and mushrooms, to name a few. The toxic substances involved in accidental poisoning of children were similar to those reported previously by Allingham (1975), Beautrais et al. (1981), Craft and Sibert (1977), Shaw (1977) and Silva et al. (1978). It is of interest to compare the percentage of medicinal products reported in

other studies of children poisoned under the age of five: Allingham (1976), 38 percent; Buffoni et al. (1981), 56 percent; Craft and Sibert (1977), 75 percent; Hancock (1973), 65 percent; Lawson, Craft and Jackson (1983), 60.5 percent; Mahdi et al. (1983), 52 percent; Shaw (1977), 46 percent; and Silva et al. (1978), 50 percent. White et al. (1980) reported that non-drug ingestions were almost exclusively (88 percent) in children four years old and younger.

The effectiveness of child-resistant containers in the prevention of accidental poisoning has been well documented (Craft, 1975; Done et al., 1971; Mofenson & Greensher, 1978; Sibert, Craft & Jackson, 1977). Scherz (1970), in an American study, found that the number of poisoning episodes in a community was reduced from 149 to 17 by the use of child-resistant containers. Beautrais et al. (1981) reported that no poisonings occurred with items stored in containers with child-resistant lids. From these studies it would appear that child-resistant containers are the greatest hope for successfully reducing the number of children who are poisoned.

The literature has revealed that generally poisonings in young children happen in the home, and that the kitchen and bathroom are especially dangerous places for poisonings to occur (Buffoni et al., 1981; Driggers, 1982; Govaerts-Lepicard, 1981; Shaw, 1977; Trudeau & Braden, 1978). Allingham (1975) and Eriksson et al. (1979) reported that 80 percent of accidental poisonings occurred in or around the home. Therefore, if the home could be made "safe", the probability of accidental poisoning could be substantially reduced.

The importance of children taking poisons in homes other than

their own, particularly in their grandparents' homes, has also been emphasized (Craft, 1975; Sibert, 1975). Craft (1975) believed that grandparents normally did not take special safety precautions with tablets when children arrived in the home. In support of this statement, Beautrais et al. (1981) reported that ten percent of the poisoning episodes occurred away from the child's own home.

An interesting issue is the frequency of accidental poisoning in children in relation to the time of day. Buffoni et al. (1981) found two peaks of frequency, one between 10 a.m. and 12 noon, and the other between 6 and 8 p.m. They maintained that such peaks reflected the hours during which the child was likely to be less closely supervised because the adults were busier around home. Also, these were the hours during which the child was more likely to be hungry, hence more prone to eat whatever came handy (Buffoni et al., 1981). However, several studies have documented variation in poisoning occurrence by hour of the day and there were some discrepancies in the reported trends for childhood poisonings with morning (Craft & Sibert, 1977; Hancock, 1973; Shaw, 1977); midday (Shaw, 1977); and evening (Hancock, 1973; Greenberg & Osterhout, 1982a) peaks all observed.

Greenberg and Osterhout (1982a) reviewed the poison control center records of the Duke University Medical Center for 1977 and reported the peak ingestion periods fell between 6 and 9 p.m. They speculated that this time correlated with mealtimes and might reflect food-seeking behaviour, or perhaps the guardians were distracted by other chores during these times and left the child unattended. In addition, Greenberg and Osterhout (1982b) reported that preschool

children had a September through November poisoning peak. White et al. (1980) retrospectively reviewed 111 cases of poisoning over a 4-1/2 year period and found no predominance of the time of day or day of the week. Craft and Sibert (1977) and Hancock (1973) documented no significant difference in the number of ingestions occurring on various days of the week although surveys have shown that small increases occurred on Mondays and Thursdays (Sibert, 1975); Mondays, Tuesdays, and Wednesdays (Shaw, 1977); and Wednesdays (Buffoni et al., 1981). In the latter study the least represented day was Sunday.

While some investigators (Craft, 1975; Jackson et al., 1968; Scherz, 1970) determined that the main factor in the accidental poisoning of children was that poisonous substances were too readily accessible to them, of late, the physical environment and the availability and accessibility to poisons in the home have been contested as important factors in the cause of childhood poisonings (Baltimore & Meyer, 1969; Beautrais et al., 1981; Margolis, 1971; Sobel, 1969). In fact, Sobel (1969) reported that no significance was found in the degree of hazard in the homes of 122 families with a history of poisoning, as compared with the homes of 278 controls. This indicated that the presence of a poisonous agent was necessary but not sufficient for the occurrence of a poisoning.

Psycho-Social Environment. Poor psycho-social environment constitutes a major environmental hazard to children (Scanlon, Kaufman, Fuerbinger, Shukan, King, Mandel & Needleman, 1974). To a great extent, poor psycho-social environment has been found to be clearly correlated with lack of parental knowledge, disrupted parent-child

relationships and childhood psychological maladjustment. To a lesser extent, poor psycho-social environment has been found to be correlated with socioeconomic deprivation and other demographic factors.

Little has been documented about the poison prevention education of parents in any of the studies on accidental poisoning in children. Allingham (1975) reported the stated ignorance of 44 percent of those interviewed on this subject and Shaw (1977) reported considerable variability in the mother's knowledge of the toxicity of the substances ingested by the child: 46 percent of the mothers thought the substance to be poisonous, 16 percent did not think it was, and 38 percent were ignorant about the potential toxicity of the substance that their children had taken. Eriksson et al. (1979) reported that the majority of parents (54-68 percent) had not received any information about the risk of poisoning.

Beautrais et al. (1981) documented the circumstances of accidental poisoning from a three-year prospective study of accidental poisoning in a birth cohort of 1,124 children in New Zealand. They reported that in most cases (86 percent), the child's mother was looking after the child when the episode occurred, and for one case in three, some distraction (for example, a telephone call) was alleged to have taken her attention away from the child. Other studies (Allingham, 1975; Shaw, 1977) supported these findings.

Katz (1976) is one author who has referred specifically to the relationship between accidental poisoning in preschool children and the specific characteristics of their psycho-social environment. He theorized that the child who ingests a poisonous substance may have a

limited and frustrating relationship with his mother, resulting in a power struggle for autonomy. The child may take the poisonous substance knowing it is forbidden. Thus, the ingestion of poison may be the result of purposeful behaviour on the part of the child.

The important role of family stress in the etiology of childhood poisoning was hinted at by Sobel (1970) in a large retrospective psychiatric survey in the United States. Sobel (1970) studied children and their families in a large community study, comparing children who had poisoning incidents in the past with those who had not. Although the majority of this work was concerned with maternal psychopathology and stress, he also looked at aspects of child psychopathology and personality. Looking at the relation between mother and child, the only significant difference was that poisoned children had more power struggles with their mothers than did controls.

Margolis (1971) studied children five years after they took poisons as toddlers and found that they could be differentiated from control subjects several years later. These children showed significant problems, including hyperactivity, destructiveness, uncooperativeness, and aggressiveness. Buffoni et al. (1981) reported a similar character profile and determined the crucial factor as being the quality of the mother-child relationship.

Sibert (1975) conducted a prospective investigation of the role of family stress in childhood poisoning in a British community and found it to be an important factor in accidental ingestion of poisons in childhood. Sibert (1975) believed that family stress might contribute to making poisons readily available to children, either

because parents under stress might be less careful, or because medicines were being used during an illness. This increased availability of potential toxins was a factor in some cases but did not seem to be the major cause of the problem as a whole (Sobel, 1969). Sibert (1975) stated that a more likely possibility was that children's behaviour was altered when there was unhappiness in the home with disordered family relationships. Katz (1976) reported the stress factors found to be important in accidental poisoning in children included: serious illness in the family, maternal pregnancy, a recent move, the absence of one parent from the home, unemployment on the part of the father, and the presence of a mentally retarded child.

Changes in accommodation were found to be greater in poisoned children's families than in families of non-poisoned children. The exact number of moves and the time between moves that was found to contribute to a child's susceptibility to accidents varies between studies. Some investigators (Sibert, 1975) specified a move within three months, while others (Shaw, 1977) specified the previous five years. Dershewitz and Christopherson (1984) offered the explanation that relocation to a new home creates a chaotic environment and compromises supervision, thus creating an atmosphere conducive to accidents. This latter explanation would be inadequate when related to a five year time frame.

Lewis et al. (1966) conducted a study with 14 poisoned children and 14 controls which revealed three major determinants of the poisoning event: (1) the child's ability to explore his environment; (2) excessive availability of toxic substances; and (3) a depletion of

the mother's emotional resources, frequently brought on by the loss of her own mother or the birth of another child. It was assumed that the depletion of the mother's resources was responsible for inadequate child care, which in turn led to poor self-esteem on the child's part, inadequate self-protection, and lack of desire to please the mother. The poisoning was seen as a negativistic and self-destructive response to such frustration.

A depletion of maternal emotional resources might be reflected in either attention-seeking devices (Sobel & Margolis, 1965) or self-destructive responses (Lewis et al., 1966) on the part of the child. Each could lead to a mother-child power struggle which was noted to be important in poisoned children and their mothers, thus damaging the mother-child bond (Sobel, 1970). However, Basavaraj and Forster (1982) conducted a study in Ireland to examine risk factors in 112 children, aged 1-4 years, admitted with accidental poisoning, and failed to support the view that family stress is an important factor in accidental poisoning.

Sobel (1970) reported that the families of poisoned and control children were not differentiated by socioeconomic status; which he measured by combining four factors: occupation, income, education, and housing. There would appear to be a discrepancy between the reported finding that childhood poisoning occurs most frequently in the lower class family (Craft, 1975; Eriksson et al., 1979), and the finding that socioeconomic status makes no difference (Jackson et al., 1968; Katz, 1976; Margolis, 1971; Sobel, 1970). Sibert (1975) found that unemployment was significantly more prevalent in the families of

children under five years who ingested poisons, than in the controls.

Sobel (1970) further analyzed other demographic factors which revealed no relationship between childhood poisoning and each of the following: mother's age, mother's marital status (married, separated, divorced), and whether or not the mother worked. The findings of Lewis et al. (1966) concurred that the average age of the mothers of the poisoned children and control group were similar, 26 years and 24 years respectively. The results of Beautrais et al. (1981) showed that poisonings were more common amongst children of young mothers (less than 25 years old). However, Shaw (1977) reported no statistical relationship between poisoned children's and control children's parents in terms of age and race.

Summary

The available research evidence suggests that the following variables are probably of major importance in the accidental poisoning of preschool children:

1. The sex of the child - males generally appear to outnumber females;
2. The age of the child;
3. The number of siblings of the child - the only child seems less likely to be poisoned than the child from a family with several children;
4. The incidence of repeat poisoning of the child;
5. The personality and behavioural traits of the child - for example, hyperactivity, aggressiveness, negativism, and the degree to

which a child is adventuresome and exploratory;

6. The manner in which the physical environment is organized - this includes the availability and accessibility to poisons in the home;

7. The type of substance ingested by the child - drugs appear to be the most common agents;

8. The type of container containing the poisonous substance;

9. The location of the poisoning accident - most poisonings appear to occur in the child's own home;

10. The time of day - peak ingestion periods appear to reflect the hours during which the child is more likely to be hungry (that is, mealtimes);

11. The day of the week;

12. The responsibility for the child - in most cases the child's mother appears to be looking after the child;

13. The level of family knowledge - or ignorance - of poisons and safety practices;

14. The amount of stress in the family situation and the resultant quality of the parent-child relationship - significantly more poisoned children come from families with one or more of these characteristics: a recent move has been made by the family; the mother or another family member is seriously ill; the mother is preoccupied with other children, pregnancy, or outside employment; the father or some other male figure is absent from the home; and

15. The demographic characteristics of the parents.

There are research findings reported in the literature which support a role for each of these variables in the accidental poisoning

of children. However, a search of the literature for studies, either theoretical or empirical, which included all of the above variables, revealed few such studies. The vast majority attempted little beyond a description and tabulation of the phenomenon of childhood accidental poisoning.

In summary, it appears that childhood poisoning occurs with greater frequency in certain kinds of families and to certain kinds of children. Accidental poisoning in preschool children can be assumed to be an outcome of a host of interrelated environmental and developmental variables and cannot be understood without reference to the child's family context.

CHAPTER 3

METHODOLOGY

Research Design

This was a descriptive study designed to explore some of the possible environmental factors in the home contributing to the accidental poisoning of children 1-4 years of age and to examine the relationship between these factors and the developmental state of the children who ingested the poison. From the review of the literature, several factors were identified as possibly contributing to accidental poisoning in preschool children. These factors included: (1) demographic characteristics of the parents, (2) characteristics of the children, (3) the poisonous substances, (4) events surrounding the poisoning accidents, (5) parental knowledge of poisonous substances and first aid measures, (6) characteristics of the children's home environment and (7) characteristics of the children's developmental status. Data were collected on these variables.

Criteria for Selection of Subjects and Sample Size

Children treated for accidental poisoning in the emergency department of a large university teaching hospital were selected for inclusion in the study based on four criteria. One was that children with chronic disease or birth defect be excluded from the group. A second criterion was that all those selected to participate in the study were accompanied by an adult who was able to understand, speak, and read the English language. The third criterion to be met by the subjects was that they reside in Edmonton or within a 15-mile radius.

The fourth and last criterion was that the parents had been informed of the purpose and procedures to be used in the study and had voluntarily agreed to participate. A convenience sample of 12 mother-child dyads meeting the foregoing criteria were admitted to the study over a three month period.

The sample size was determined by scanning the emergency room logbooks for all recorded complaints of ingestion of possible poisoning, during three randomly selected months (June and September, 1983 and February, 1984) preceding the time of data collection. A subsequent survey of the medical records of those patients identified in the logbook revealed that the numbers of children aged 1-4 treated in the emergency department during the respective months were 11, 11, and 15. The average number of children seen in each of these three months was 12, and this average number was used to determine the number of subjects to be included in this study.

Setting

The study was carried out in the homes of the children who presented for treatment of accidental poisoning in the emergency department of a large university teaching hospital.

Assumptions

The study proceeded on the following basic assumptions:

1. Accidental poisoning of a young child is a complex interaction requiring consideration of the developmental state of the child and certain environmental factors in the home.
2. The home is the richest environment for observing a child's development and interactions with family members.

3. Parents are generally accurate in their descriptions of their children's behaviour.

Research Instruments

Three tools, the Home Observation for Measurement of the Environment (Birth to Three), the Denver Developmental Screening Test, and a questionnaire, were used to assess respectively: (1) the current environment in which the child was living; (2) the child's developmental status; and (3) various demographic, social, and parental factors interacting within the life of the child.

The Home Observation for Measurement of the Environment. The Home Observation for Measurement of the Environment, the HOME (Caldwell & Snyder, 1978), consists of 45 items designed to assess certain characteristics of the environment in which a young child is developing. The items represent the following six subscales: (1) emotional and verbal responsivity of the mother, (2) avoidance of restriction and punishment, (3) organization of the physical and temporal environment, (4) provision of appropriate play material, (5) maternal involvement with the child, and, (6) opportunities for variety in daily stimulation. A copy of the HOME is presented in Appendix 1.

Observations that are made and answers that are given by the mother or primary care-giver in the semistructured interview administered in the home serve as the basis for scoring the HOME. Approximately one-third of the items are based on observation of the child in the natural habitat in interaction with the principal care-giver. All items on the HOME are scored in binary fashion ('yes'

or 'no') and are phrased so that the total score equals the number of affirmative responses marked by the interviewer. Administration of the HOME requires a home visit of about an hour's duration.

Previous research has provided evidence of the HOME's reliability and validity. Specifically, interrater reliability for the instrument has been estimated at .90 (Bradley & Caldwell, 1977; Elardo, Bradley & Caldwell, 1975; Elardo, Bradley & Caldwell, 1977); internal consistency for the total score at .89 (Bradley & Caldwell, 1977; Elardo et al., 1975); and correlations with various cognitive measures such as the Mental Development Index of the Bayley Scales of Infant Development and the Stanford-Binet Scale, as high as .72 (Elardo et al., 1975).

The criterion-related validity of the HOME has been explored in several studies (Bradley & Caldwell, 1976a; Bradley & Caldwell, 1976b; Elardo et al., 1975; Wulbert, Inglis, Kriegsmann & Mills, 1975), with results consistently supporting the ability of the HOME to distinguish among environments varying in terms of several indices of quality.

Elardo et al. (1975) indicated that HOME scores were related to intelligence test scores. HOME scores taken for 76 normal infants during the first two years of life showed a moderate relation to performance on the Bayley Mental Development Index and a strong relationship to three year Stanford-Binet scores. Results from this study were related to those from a later study by Bradley and Caldwell (1977). Bradley and Caldwell (1977) assessed the home environments of 91 six month old infants using the HOME. The Stanford-Binet was administered when the children were three years of age. The findings from this study suggested the usefulness of the HOME in screening for

developmental delay. Bradley and Caldwell (1977) concluded that the HOME apparently measured aspects of the environment that were significantly associated with cognitive development.

In addition, there have been other reports attesting to the validity of the HOME. Wulbert et al. (1975) assessed the home environments and mother-child interactions of a language-delayed group of 20 children and a matched control group of normal preschool children using the HOME. The language-delayed group had significantly lower scores in five of the six subcategories of the HOME. The findings from this study were similar to those reported by Elardo et al. (1977), who assessed the home environments of 74 normal children when they were six and 24 months old, with the HOME. When three years of age, each child was administered the Illinois Test of Pyscholinguistic Abilities. The researchers concluded that it was possible to specify some of the parameters of early experience related to certain aspects of language development.

Bradley and Caldwell (1976a) concluded that HOME scores were related to intelligence test scores, during the period from six months to three years of age. Seventy-seven normal infants were administered the Bayley Scales of Infant Development at six months and the Stanford-Binet Intelligence Scale at three years. When each child was six months old, the family was observed and interviewed using the HOME. The multiple discriminant analysis in which data from all 77 children were used showed that it was possible to differentiate among the group that improved in mental test performance, the group that remained stable, and the group that declined on the basis of home environment

scores. A statistically significant difference was found for these three groups on the six HOME scores.

In a follow-up study with 49 normal infants and their families, Bradley and Caldwell (1976b) reported that HOME scores during the first two years of life were strongly related to 54-month Stanford-Binet Intelligence Test scores. The multiple correlations between HOME subscale scores and Binet performance were .50 and .63 at six months and 24 months, respectively.

Bradley, Caldwell, and Elardo (1977) made a comparison between an environmental process measure (utilizing the HOME) and socioeconomic status measures in terms of their relations with Stanford-Binet scores at three years of age. The subjects were 105 children and their families. The findings indicated that the HOME predicted intelligence test scores as well as a combination of process and status measures. Elardo et al. (1977) correlated HOME scores for 91 families with seven socioeconomic status variables including welfare status, maternal education, paternal education, maternal occupation, paternal occupation, paternal presence, and crowding in the home. Correlations between the subscales and all the variables except welfare status and maternal occupation were low to moderate (.25 to .55). Results from these two studies and a similar study by Ramey, Mills, Campbell, and O'Brien (1975) showed that the HOME could be used to screen homes to determine which pose a "risk" to the child's development.

These studies have provided a substantial amount of data on the validity of the HOME in terms of assessing aspects of the environment similar to those assessed with social status indices and cognitive

development. Low to moderate correlations were observed between HOME subscale scores and socioeconomic status measures. If the correlations had been higher, the HOME could not be considered a more sensitive index of the home environment than socioeconomic status. Had the correlations been lower, Caldwell and Bradley (1984) concluded that no claims could have been made that the HOME was measuring certain aspects of environmental quality known to be related to child development.

Erickson (1976) reported that the HOME can be important in: (1) helping identify areas of strengths and weaknesses in a family, (2) planning appropriate guidance for a family, (3) identifying developmental risk before a child is 3 years of age, and, (4) planning intervention strategies when weaknesses or deficits are observed. The HOME has been used to differentiate "high risk" homes thought to be potentially high contributors to the developmentally retarded population from "normal" homes drawn at random from the general population (Ramey et al., 1975). The HOME has also proven to be a valuable baseline to evaluate the effectiveness of prevention and intervention programs for the home environment (Hamilton, 1972). Erickson (1976) suggested that the HOME can be a useful tool for nurses, physicians, and early child care educators who must expand their roles in terms of assessing the child's developmental status, as well as assessing the child's developmental environment.

The Denver Developmental Screening Test. The Denver Developmental Screening Test, the DDST (Frankenburg, Dodds, Fandal, Kakuk & Cohrs, 1975), is one of the most widely used screening tests for

assessing a young child's developmental status (Erickson, 1976; Tackett & Hunsberger, 1981; Whaley & Wong, 1979). The test yields a developmental profile of a child from birth to six years in four skill areas: personal-social, fine motor-adaptive, language, and gross motor.

The DDST is a standardized scale consisting of 105 items (Frankenburg et al., 1975). Each item is designated by a horizontal bar that represents the ages at which 25, 50, 75 and 90 percent of the standardization population is able to perform the particular item. The time required to test one child is 15-20 minutes (Frankenburg, Goldstein & Camp, 1971).

Scoring of the DDST results from the tester's observation of the tasks the child performed, or, for certain items, a report from the parents that the child can perform the task (Frankenburg et al., 1975). The DDST differs from most inventories because the parent report is used to compute the child's score.

Interpretation of the DDST scores depends on the number of delays found in the test (Frankenburg et al., 1975). A delay is defined as any item failed which is completely to the left of the age line; that is, the child failed an item which 90 percent of the children normally can pass at a younger age. The number of delays on each test yields an overall score of "abnormal", "questionable", or "normal" development. Abnormal development is determined by: (1) two or more sectors with two or more delays, or (2) one sector with two or more delays plus one or more sectors with one delay and, in that same sector, no passes through the age line. Questionable development is determined by: (1) one sector with two or more delays, or (2) one or more sectors with one

delay and, in that same sector, no passes through the age line. If the child refuses to cooperate with testing so that a large number of items would be scored as failures, the child is evaluated as untestable. Normal development is determined by any score that does not meet these three other criteria.

For maximum accuracy, screening tests should be reliable and valid (Tudor, 1977). Reliability means that the tool should give the same results about a child if it is administered by different examiners (interrater reliability) or if it is repeated after a short time lapse (test-retest reliability). Validity of the tool is determined by sensitivity, the ability of a test to correctly identify the delayed children and specificity, the ability to correctly identify the children who are not delayed (Frankenburg et al., 1971).

The DDST has been found to be both reliable and valid (Erickson, 1976; Frankenburg & Dodds, 1967; Tackett & Hunsberger, 1981). Frankenburg and associates have published several studies relating to test-retest stability on the DDST at a one week interval. Frankenburg and Dodds (1967) reported that 20 children ranging in age from two months to 5 1/2 years were tested twice by the same examiner at the interval of one week and the agreement over the one week interval was 95.8 percent. Frankenburg and Dodds (1967) also found that inter-examiner reliability was 90 percent when each of four examiners tested 12 children. The youngsters were tested once by the first examiner, and immediately after by the second examiner. Some of the variability accounting for lack of agreement was due to discrepancies between examiners in administering and scoring items. Generally, it

was felt that after testing a few children, it was fairly easy to obtain reliable administration and scoring.

Later work by Frankenburg, Camp, Van Natta, Demersseman & Voorhes (1971) evaluated tester-observer agreement and test-retest stability of the DDST with 76 and 186 subjects, respectively. The correlation coefficients for mental ages test-retest stability obtained at a one-week interval were calculated for 13 age groups between 1.5 months and 49 months. Coefficients ranged between .65 and .93 with no age trend displayed. On individual test items, tester-observer agreement was generally greater than the test-retest stability. However, the test-retest stability of the DDST was as high or higher than similar reliabilities for such diagnostic tests as Bayley's Revised Scale of Mental and Motor Development.

With regard to the validity of the DDST, Frankenburg and Dodds (1967) found that this test correlated highly (.97) with the Revised Yale Developmental Schedule, in a preliminary study of 18 children ranging in age from four to 68 months. In a subsequent study, concurrent validity of the DDST was investigated with a larger sample (Frankenburg, Camp & Van Natta, 1971). The DDST was administered to 236 children in conjunction with the following criterion tests: Stanford-Binet, Revised Yale Developmental Schedule, Cattel, and the Revised Bayley Infant Scale. Correlations of mental ages obtained with the DDST and the criterion tests varied between .86 and .97. The results of the validity study led Frankenburg et al. (1971) to the conclusion that the DDST was useful as a screening test for identifying developmental deviations. Camp, van Doorninck, Frankenburg, and Lampe

(1977) also reported positive correlations with the DDST and psychometric tests such as the Cattel Infant Intelligence Scale and the Revised Bayley Infant Scale.

The majority of studies done with the DDST support the instrument with regard to face and concurrent validity. One limitation of the DDST involves its predictive validity, particularly in the testing of children of minority ethnic groups (Tackett & Hunsberger, 1981; Whaley & Wong, 1979). Further, Stedman (1975) cautions that those who use the DDST must remember that it is not a definite predictor of current or future adaptive or intellectual ability.

Questionnaire. A questionnaire designed for use in this study served as the survey instrument by which additional data were gathered. The nature of the questions centered around factors which could lead to accidental poisoning of children in the 1-4 age group. The questionnaire consisted of eight parts: (1) demographic characteristics of the parent(s), (2) characteristics of the child, (3) the type and state of the poisonous substance, (4) the location of the poisonous substance, (5) storage of the poisonous substance, (6) events surrounding the poisoning accident, (7) events following the poisoning accident, and (8) parental knowledge about poisons and suggestions for poison prevention. Some of the questions were adopted from a public survey used by Alberta Social Services and Community Health in 1981 (Tracy, 1981). The remainder of the questions were developed following an extensive review of the literature concerning accidental poisoning in children. A copy of the questionnaire is included in Appendix 2.

The questionnaire was submitted to three experts in pediatric nursing for evaluation of clarity, relevance, and representativeness of items. The three experts consisted of: (1) a nurse educator who teaches growth and development, (2) a nurse researcher with a background in pediatric nursing, and, (3) a nurse specialized in pediatric nursing and doing research in pediatric nursing. Item agreement among the three nurse experts was set at a minimum of 66 percent for face validity. The questionnaire was also given to five mothers or primary care-givers in a pilot study for evaluation of clarity and time required to complete. Appropriate modifications were made for all aspects of the questionnaire which needed revision.

Investigator Training Procedures

In order to use the HOME Inventory efficiently and accurately, the investigator followed the procedure outlined by Caldwell and Snyder (1978). The investigator and another observer certified as a reliable examiner with the HOME Inventory, worked in pairs on 12 home visits. The interviews were scored independently although all scoring differences were discussed and clarified. Interrater reliability was established at 90 percent or greater on the basis of the percentage of items that both raters observed and agreed on. The range of the interrater reliability was 91 to 100 percent, with a mean of 96.7 percent. Both investigators were then able to administer the inventory individually (Caldwell & Snyder, 1978; Elardo, et al., 1975).

The Denver Developmental Screening Test also requires proper training in administration, scoring and interpretation of items

(Erickson, 1976). Stedman (1975) asserted that persons trained in the areas of health or allied health professions are excellent trainees and screeners. Prior to training, the DDST manual and a training film on the DDST were utilized to assure familiarity with the instrument. The investigator was then trained to use the DDST by a nurse educator familiar with the tool, in order to ensure that items were administered according to the standardized method for which the developmental items were validated. Interexaminer reliability was established at 100 percent with five home visits. Training was completed prior to the initiation of this study.

Ethical Considerations

Because this study necessitated the involvement and cooperation of human subjects, certain ethical procedures were established in order to protect the subjects' rights. The research proposal was subjected to peer and faculty review. Next, permission to conduct the study was obtained from the Medical and Nursing Directors of the emergency department, the Nursing Research and Scholarly Activities Committee, and the Special Services and Research Committee in the proposed agency. Finally, the nurse researcher contacted the parent(s) by telephone to explain the purpose of the study, to outline the methodology, and to obtain verbal consent to conduct the study. At the initial visit with the parent(s) in the home, the parent(s) were informed in writing about the study and were asked to sign an informed consent form (see Appendix 3). All individuals were assured that their names would not be associated with any of the research results.

Data Collection Procedures

Parents of children meeting the sample criteria were contacted by telephone within two days of the child's admission to the emergency department. The names of the potential subjects were obtained from the emergency room logbook on a daily basis. The cooperation of the parent was sought, making certain that the parent being contacted knew the following: (1) who the researcher was; (2) the purpose of the study; (3) that the names and identities of all subjects involved in the study would be kept confidential; (4) how the study would be conducted; (5) how much time to allow for the visits; (6) that the parent would be giving something of value to the researcher and to all people who were concerned about young children; (7) that the parent might not directly benefit from the study; and, (8) that the parent could withdraw from the study at any time with no consequence.

If a parent agreed to participate in the study, an appointment was made for a home visit at a time convenient for the parent, within a week of the child's visit to the emergency department. The informed consent form was signed at the initial visit and the HOME administered. If the child was asleep, another appointment (preferably for later the same morning or afternoon) was made at a time when the child was awake and could be observed in the normal routine for that time of day. After completing the HOME, the researcher asked the mother if her child's behaviour during the visit was typical of the child's usual behaviour. Then a second appointment for a home visit to administer the DDST was made. The parent was asked to complete the questionnaire which the researcher collected later when making the

second visit.

No difficulties were encountered in following these children through the two home visits as outlined in the foregoing procedure. All of the parents contacted agreed to participate in the study and there was no attrition or withdrawal during the course of the study.

It was recognized by the researcher that the parents might be threatened by the nature of the study. Researchers have found that some parents experience guilt when their child has ingested a poisonous substance. Therefore, the researcher studying accidental poisoning in preschool children must be objective and accepting, as opposed to approving or disapproving. Questions must not be asked in a threatening or judgmental manner. Erickson (1976) asserted that administration of the HOME and DDST required more than just presenting selected items correctly. Using the tools well required sensitivity to each child's uniqueness, attention to the child's individual way of responding, and regard for the strengths as well as for the weaknesses that were observed (Erickson, 1976). The researcher must be alert to signs of fatigue, anxiety, illness, shyness, drowsiness and inattentiveness, and appropriately adjust or postpone the screening (Thorpe & Werner, 1974).

In order to maximize reliability and validity of the test results, the investigator adhered to the following steps: (1) appointments were arranged at a time convenient for the mother and when the child was awake; (2) visits were rescheduled if the child was asleep; (3) after completing the tests, the mother was asked if her child's behaviour during the visit was typical of the child's usual

behaviour; and (4) after completing the tests, the parents were encouraged to ask questions.

Data Analysis

Once data were collected on the 12 study children and their families, the findings from the questionnaire were summarized for relevant information and presented in table form. Descriptive statistics (means, standard deviations, ranges, and frequencies) were utilized, where appropriate, to describe all relevant variables of the study.

The t test for independent samples was used to determine if differences existed between the study sample scores and the age appropriate normative scores, in terms of the means for each subscale score and the total score of the HOME Inventory. Bruning and Kintz (1977) stated that the most common use of the t test is to determine whether the performance difference between two groups of subjects is significant. In conducting the independent t test, two assumptions are required: (1) the dependent-variable scores for both populations are normally distributed, when the samples are small; and, (2) the variances of the dependent-variable scores for the two populations are equal (Spatz & Johnson, 1981). Despite these requirements, the t test is a robust test, which means the t distribution leads to fairly accurate probabilities even if the populations violate the underlying assumptions (Spatz & Johnson, 1981).

The Mann-Whitney U-test was employed to determine if two independent groups, based on selected demographic variables, were drawn

from the same population. The Mann-Whitney U-test is sensitive to both the central tendency of the scores and the distribution of scores (Hinkle, Wiersma & Jurs, 1979). This test is one of the most powerful of the non-parametric tests, and it is considered a most useful alternative to the parametric t test when the investigator wishes to avoid the t test's assumptions, or when the measurement in the research is weaker than interval scaling (Siegel, 1956).

For testing the relationship between total HOME scores and selected variables, data that were measured on interval and ratio scales were analyzed using the Pearson product-moment correlation coefficient (r). Two assumptions underlying the use of the Pearson r are: (1) that both variables are measured on at least an interval scale, and, (2) that the underlying distributions of both variables are normal (Hinkle et al., 1979). The point-biserial correlation coefficient is a special case of the Pearson r and was used to analyze the relationship between total HOME scores, which yield interval data, and selected variables that were measured on a nominal scale.

CHAPTER 4

RESULTS

Introduction

Data collection was completed during June, July and August of 1984, and took, on average, approximately two and one-half hours for each of 12 subjects. All data collection took place at the participating parent-child dyad's own home. In this chapter, the findings from the questionnaire, the Home Observation for Measurement of the Environment and the Denver Developmental Screening Test are presented.

Questionnaire

From the questionnaire, eight groups of questions were asked and results were tabled according to these groups. Questions relating to the demographic characteristics of the parents, characteristics of the children, the type and state of the poisonous substances ingested by the children, the location of the poisonous substance when the child obtained it, the site of the poisoning accident and storage of the poisonous substance, events surrounding the poisoning accident, events following the poisoning accident, and parental knowledge about poisons and suggestions for poison prevention are set out in Tables 4.1 through 4.8, respectively.

Characteristics of the Parents. The demographic characteristics of the parents are shown in Table 4.1. The majority of the study mothers and fathers were between 25-34 years of age (ten and seven,

Table 4.1

Selected Demographic Characteristics of the Parents[a]

Variable		n	%
Age			
	Mother		
	15-24 years	2	16.7
	25-34 years	10	83.3
	Father		
	25-34 years	7	70.0
	35-44 years	2	20.0
	45-54 years	1	10.0
Race			
	Mother		
	White (Caucasian)	11	91.7
	Black (Negro)	1	8.3
	Father		
	White (Caucasian)	9	90.0
	Black (Negro)	1	10.0
Marital Status			
	Mother		
	Married	7	58.3
	Divorced	2	16.7
	Separated	2	16.7
	Common-law	1	8.3
	Father		
	Married	7	70.0
	Separated	2	20.0
	Common-law	1	10.0
Years of Schooling			
	Mother		
	9-11	4	33.3
	12	5	41.7
	13-15	1	8.3
	16-20	2	16.7
	Father		
	9-11	4	40.0
	12	1	10.0
	13-15	0	0.0
	16-20	5	50.0

Table 4.1 (continued)

Variable	n	%
Family Income (Before Taxes)		
Less than $4,999	1	8.3
5,000 - 9,999	1	8.3
10,000 - 14,999	1	8.3
15,000 - 19,999	2	16.7
20,000 - 24,999	1	8.3
25,000 - 29,999	1	8.3
30,000 - 49,999	5	41.7
Working Status		
One Parent Family	4	33.3
Mother working full-time outside the home	2	16.6
Mother not working outside the home	2	16.6
Two Parent Family	8	66.7
Father and mother working full-time outside the home	1	8.3
Father working full-time and mother working part-time outside the home	1	8.3
Father working full-time outside the home	6	50.0

a Complete data were not available on all families.

respectively). The racial distribution of the study parents was primarily Caucasian. Only one child's parents were not white.

The parents of four (33.3 percent) of the study children were not living together due to separation or divorce. The educational level of the parents was determined by including any programs of education beyond high school, for example, college, university and vocational training. The average number of years of schooling the study mothers had experienced was 12.5, with a range of 9-19 years, and a standard deviation of 3.03 years. The study fathers averaged 14.4 years of schooling, with a range of 10-20 years, and a standard deviation of 3.92 years.

The distribution of total family income for the year before taxes showed the variability of the sample with regard to social class. The median income category was $24,999.50. Three (25.0 percent) of the study sample reported that they were on social assistance.

Characteristics of the Children. With regard to the characteristics of the children in the study (Table 4.2), a preponderance of females (eight) comprised the sample. The combined age group of children between 13 and 37 months accounted for 10 of the 12 cases. The mean age of the study children was 25.1 months, with a range of 12-41 months, and a standard deviation of 8.82 months.

Only children accounted for one-third of the study sample. Six of the study children had one sibling. One of the study children had two siblings and the remaining study child had four siblings.

Two of the children involved in the study had previous episodes of poisoning, while three incidents of sibling poisoning occurred amongst the families studied. Of the two target children with a past

Table 4.2

Selected Characteristics Relating to the Study Children

Variable		n	%
Sex of Child			
	Male	4	33.3
	Female	8	66.7
Age of Child			
	12 months	1	8.3
	13-24 months	5	41.7
	25-36 months	5	41.7
	37-48 months	1	8.3
Birth Order of Child			
	First child	3	25.0
	Second child	3	25.0
	Third child	1	8.3
	Last (fifth) child	1	8.3
	Only child	4	33.3
Number of Siblings of Child			
	None	4	33.3
	One	6	50.0
	Two	1	8.3
	Three	0	0.0
	Four	1	8.3
Number of Siblings Aged 1-4 Years of Child		4	33.3
Care of Preschool Children During the Weekday			
	Their mother at home	8	61.5
	Babysitter's home	2 a	15.4
	Day care centre	3	23.1
Care of Preschool Children During the Weekend			
	Their mother at home	12	70.6
	Their father at home	4 b	23.5
	Grandparents	1 c	5.9

Table 4.2 (continued)

Variable	n	%
Previous Poisoning Episode of the Child		
Yes	2	16.7
No	10	83.3
Number of Siblings Ever Poisoned		
None	10	83.3
One	1	8.3
Two	1	8.3

a One mother worked part-time outside the home in which case her child was sometimes cared for in the babysitter's home.

b Four mothers reported that their husbands helped care for the children during the weekend.

c One single-parent mother stated that her parents helped care for the children during the weekend.

history of accidental poisoning, one was a male aged 17 months who ingested a devil's ivy leaf at 10 months of age, and the other was a male aged 19 months of age who ingested a poinsettia leaf at six months of age. The latter child was also included in the sibling group. This child and an older sibling ingested children's tylenol tablets. The other case of sibling poisoning involved a female target child aged 21 months of age who ingested insect repellant. This child had four siblings ranging in age from 50 months to 12 years. The mother reported that two brothers aged two and three years of age in 1974 and 1978, respectively, ingested triaminic cough syrup and carpet shampoo, respectively.

Characteristics of the Poisonous Substances. When considering the type of poisonous substances ingested, drugs as a source of poisoning accounted for eight cases (66.7 percent) and occurred more often than general poisonous substances of the commercial, household, and agricultural variety (Table 4.3). Only two (16.7 percent) of the pharmaceutical preparations that were ingested had been prescribed. Plants as a source of poisoning accounted for one instance of poisoning in this study, but had been a cause of previous poisoning in both repeated cases.

The data reported in Table 4.4 show that seven (58.3 percent) of the poisoning episodes occurred in the kitchen, followed by two episodes (16.7 percent) in the bedroom. The parents' responses indicated that the poison was left within easy access of the child in ten (83.3 percent) of the cases (on a chair, in an unlocked cupboard, on the floor, or on a low counter or table). It was noteworthy that in

Table 4.3

Type and State of the Poisonous Substances Ingested by the Children

Variable	n	%
Type of Poisonous Substance		
Drug		
Prescribed	2	16.7
- Bactrim Suspension		
- Birth Control Pills		
Over-the-counter	6	50.0
- Triaminicol cough syrup		
- Children's tylenol		
- Children's tylenol		
- Children's aspirin		
- Anacin		
- Anacin		
Cosmetic		
- Brut aftershave	1	8.3
Other	3	25.0
- Diaparene towel liquid		
- Dieffenbachia leaf		
- Insect repellant		
State of Poisonous Substance		
Liquid	5	41.7
Solid	7	58.3

Table 4.4

Location of the Poisonous Substance When the Child Obtained It

Location	Feet Above Floor Level 0 - 2	2 - 4	4 - 6	n	%
In Storage				4	33.3
Bedroom chair	1				
Kitchen cabinet			2		
Front porch	1				
In Use or Not Returned to Storage Place				7	58.3
Kitchen counter		2			
Kitchen table		3			
Bedroom dresser		1			
Bathroom counter		1			
Plant				1	8.3
Livingroom floor	1				

two cases the poisonous substance (children's tylenol tablets) was stored in a kitchen cabinet, four to six feet above floor level, in a child-resistant container. In this study, the poisonous substance was stored in a child-resistant container in three cases.

In ten cases (83.3 percent) the poisoning episode occurred in the child's own home (Table 4.5). The most common indoor site for the storage of the poisonous substance was the kitchen (n = 5) and it was there that the majority of indoor poisoning episodes occurred (n = 7). These figures are presented in Tables 4.5 and 4.4, respectively.

Events Surrounding the Poisoning Accident. In examining the events surrounding the poisoning accident, several important points emerged from the data (Table 4.6). At certain times of the day there was a noticeable increase in the number of poisoning incidents: four cases (33.3 percent) occurred at midday between 11:45 a.m. and 12:45 p.m., and three (25.0 percent) occurred at suppertime between 5:30 and 6:30 p.m. Three poisonings (25.0 percent) occurred on Monday, whereas four of the accidents (33.3 percent) occurred during the weekend.

The responses to the questionnaire showed responsibility for the child at the time of the accidental poisoning was most often solely the mother's. The mother had shared responsibility for the child at the time of the accidental poisoning in three cases. Combining these two categories in which the mother was either solely or jointly responsible for the child at the time of the accidental poisoning, the mother was involved in eleven (91.7 percent) of the cases. At the time of the accidental poisoning, the persons responsible for the children were engaged in a variety of activities, including indoor domestic chores, sleeping, talking with other persons, and playing with other children.

Table 4.5

Site of the Poisoning Accident and
Storage of the Poisonous Substance

Variable	n	%
Location of Poisoning Accident		
Own home	10	83.3
Grandparent's home	1	8.3
Babysitter's home	1	8.3
Place of Storage of Poisonous Substance Within the Home		
Kitchen	5	41.7
Bedroom	1	8.3
Bathroom	3	25.0
Basement	1	8.3
Livingroom	1	8.3
Front porch	1	8.3
Height Above Floor Level Poisonous Substance was Stored		
0-2 feet	3	25.0
2-4 feet	3	25.0
4-6 feet	6	50.0

Table 4.6

Events Surrounding the Poisoning Accident

Variable	n	%
Time of Day of the Poisoning Accident		
Early morning	1	8.3
Midday	4	33.3
Afternoon	1	8.3
Supper time	3	25.0
Evening	3	25.0
Day of the Week of the Poisoning Accident		
Monday	3	25.0
Tuesday	1	8.3
Wednesday	1	8.3
Thursday	1	8.3
Friday	2	16.7
Saturday	2	16.7
Sunday	2	16.7
Responsibility for the Child at the Time of the Poisoning Accident		
Mother	8	66.7
Both mother and father	2	16.7
Both mother and grandparents	1	8.3
Babysitter	1	8.3
Activities of the Person Responsible at the Time of the Poisoning Accident		
Indoor domestic chores	3	25.0
Watching television	1	8.3
Outdoor activities	1	8.3
Sleeping	1	8.3
Talking with other persons	2	16.7
Playing with other children	1	8.3
Other activities: studying	1	8.3
taking a shower	2	16.7

Eleven (91.7 percent) of the study mothers immediately contacted a professional resource: the poison control center, a physician, or hospital emergency room when they discovered their child had ingested poison (Table 4.7). Three parents (25.0 percent) used first aid measures while nine parents (75.0 percent) gave no first aid at all. Although three parents in the study had syrup of ipecac in the home, they did not administer it. In all three instances (the overdose of triaminicol cough syrup and the two cases of ingestion of children's tylenol), it is the recommended treatment, but was not given by the parents although it was available in the home. All the parents were aware of the precautions which should be taken before vomiting is induced with ipecac after the ingestion of a poisonous substance.

Parental Knowledge About Poisons. The data presented in Table 4.8 show that three parents (25.0 percent) stated they were ignorant of any information on the subject of poisoning or poison prevention. This fact was noteworthy because one of the mothers whose child had been accidentally poisoned had two older children, while one mother had one younger child and the third case involved an only child.

In response to the questionnaire, nine of the study parents indicated that they had received information on poisons and poison prevention. There was great variability in both the sources of information and in the timing of the information as it related to the particular developmental level of the child. Generally, the form of the education consisted of information sheets, pamphlets, or brochures (5 respondents); lectures or talks (3 respondents); and, television program (1 respondent). It was noteworthy that in one case of

Table 4.7

Events Following the Poisoning Accident

Variable	n	%
Initial Actions of Person Responsible When the Poisoning Accident Occurred		
Called poison control centre immediately	4	33.3
Called physician or medical clinic immediately	3	25.0
Rushed child to emergency department	4	33.3
Waited at home	1	8.3
First Aid Measures Employed		
Gave milk to child	1	8.3
Gave raw egg and milk to child	1	8.3
Performed pharyngeal stimulation on child	1	8.3
No first aid	9	75.0
Syrup of Ipecac in the Home		
Yes	3	25.0
No	9	75.0

Table 4.8

Parental Knowledge About Poisons and Suggestions for Poison Prevention

Variable	n	%
Parental Knowledge of any Education on the Topic of Poisons and Poison Prevention		
Yes	9	75.0
No	3	25.0
Source of Information on Poisons and Poison Prevention		
Doctor's office	1	11.1
Hospital (post-natally)	2	22.2
Emergency department	1	11.1
Television show	1	11.1
Drug store	3	33.3
Church	1	11.1
Form of Information on Poisons and Poison Prevention		
Information sheets/pamphlets/brochures	5	55.6
Lectures/talks	3	33.3
Other (television program)	1	11.1
Parental Awareness of Poison Symbols		
Cross Bones and Skull	5	41.7
Cross Bones and Skull and Canadian Hazardous Products Symbol	5	41.7
None	2	16.7
Parental Suggestions for the Education of Children on Poisons and Poison Prevention		
Identification	5	41.7
Identification and first aid	3	25.0
Avoidance	4	33.3
Parents' Preferred Mode of Poison Prevention Education for Children		
Television programs	1	8.3
Television programs and talks in schools	4	33.3
Talks in schools	3	25.0
Television programs and parents	2	16.7
Television programs, talks in schools and parents	2	16.7

accidental poisoning of a preschool child, the mother cited a talk from the physician in the emergency room as her initial and only source of information on poisonings. This mother had one child older than the target child. With regard to the developmental level of the child, one mother received education on poisonings and their prevention before the birth of her first child; three mothers received information immediately after the birth of their children; one mother when her child was three months old; another mother when her child was six months old; two mothers when the child was nine months old; and, one mother received information after the poisoning accident when the target child was 27 months old. Of the two mothers who received information when their child was nine months old, one mother had four older siblings ranging in age from four to 12 years. The other mother had an only child.

Ten (83.3 percent) of the study mothers indicated that they recognized and were aware of the meaning of the Cross Bones and Skull symbol to indicate poisons. While many toxic substances are labelled with the Canadian Hazardous Products symbol, only five of the 12 study mothers were familiar with this symbol. Finally, two (16.7 percent) of the study mothers were unaware of any poison symbols.

All the study mothers wanted their children to be taught about poisons and poison prevention. Their responses indicated that they thought teaching children to identify and avoid potential poisons was of primary importance in reducing and preventing poisonings. Three (25.0 percent) of the parents also wanted their children to be taught first aid in the event of a poisoning. One mother stated that it was

important that medicine should not be called "candy", and another mother stated that the use of a sticker program with the Cross Bones and Skull symbol could serve as a useful educational tool to help children learn to identify potential poisons in the home.

Parental suggestions for educating children about poisons and poison prevention included television programs and talks in nursery, day care, and play schools. Some of the individual suggestions are worth mentioning. These suggestions included aiming some of the health education at the level of older siblings, so that they could assist in prevention of poisonings; and, using parents' groups as a base for education and educational material.

The Home Observation for Measurement of the Environment

HOME Inventory scores for the study sample (n = 12) were used to calculate the mean, range of scores, standard deviation, and standard error of measurement for each of the six HOME subscale scores and total scores. Results of these calculations can be found in Table 4.9. A high score indicated the more optimal environment for the child. The grand mean was 33.51.

The means and standard deviations for the HOME subscale scores and total scores are presented in Table 4.10 by gender. Although the sample size is small, a trend was noted on the total score and the subscales: I, II, IV and V (Responsivity of Mother, Avoidance of Restriction and Punishment, Appropriate Play Material and Maternal Involvement, respectively) with girls scoring higher than boys. The mean HOME total score for males was 32.5 of a possible 45; and, for the

Table 4.9

Means, Ranges, Standard Deviations and Standard Error of Measurement for the HOME Inventory[a]

Subscale	No. of Items	Mean	Range of Scores	Standard Deviation	Standard Error of Measurement
I. Responsivity of Mother:	11	9.17	6-11	1.75	0.51
II. Avoidance of Restriction and Punishment:	8	4.67	2- 7	1.56	0.45
III. Organization of Environment:	6	4.83	4- 6	0.72	0.21
IV. Appropriate Play Material:	9	8.00	7- 9	0.85	0.25
V. Maternal Involvement:	6	3.92	0- 6	1.88	0.54
VI. Variety in Daily Stimulation:	5	2.92	1- 5	1.16	0.33
Total	45	33.51	27-40	7.92	2.29

[a] n = 12

Table 4.10

Means and Standard Deviations for each of HOME Subscales by Gender

Subscale	Gender	Mean	Standard Deviation
I. Responsivity of Mother:	Boys[a]	9.00	1.83
	Girls[b]	9.25	1.83
II. Avoidance of Restriction and Punishment:	Boys	4.00	1.63
	Girls	5.00	1.51
III. Organization of Environment:	Boys	5.00	0.82
	Girls	4.75	0.71
IV. Appropriate Play Material:	Boys	7.75	0.50
	Girls	8.13	0.99
V. Maternal Involvement:	Boys	3.50	2.65
	Girls	4.13	1.55
VI. Variety in Daily Stimulation:	Boys	3.25	0.96
	Girls	2.75	1.28
Total	Boys	32.50	5.26
	Girls	34.00	4.38

[a] Boys = 4
[b] Girls = 8

females it was 34.0.

Comparison of HOME Scores for Normative Edmonton Sample and Study Sample. The t test for independent samples was used to compare the means for each subscale score and the total HOME scores of the study sample with age appropriate normative scores obtained from Nursing Child Assessment Satellite Training (NCAST), the University of Washington, Seattle (Hammond, 1984). Researchers certified by NCAST in the use of the HOME tool have gathered a large sample of data from Edmonton. From this sample normative data for 92 Edmonton families of infants and toddlers were obtained. On the average, the study mothers were 28.2 years of age, with a range of 19-39 years, and a standard deviation of 3.71. All of the families were Caucasian. Fathers were present in 98.9 percent of the homes. The study mothers averaged 15.3 years of schooling, with a range of 9-20 years or more, and a standard deviation of 2.53. The children consisted of 47 males and 45 females. The children ranged in age from 12-36 months of age with the following age distribution: 12 months of age: n = 4; 13-24 months of age: n = 57; and, 25-36 months of age: n = 31. The mean age of the children was 21.7 months, with a standard deviation of 7.46. The birth order of the target child was: first born or only child - 47.8 percent; second born child - 31.5 percent; third born child - 16.3 percent; fourth born child - 2.2 percent; and, fifth born child - 2.2 percent.

In Table 4.11, comparison of the study sample scores with the age appropriate normative scores of the Edmonton sample revealed significant findings ($p < .01$) on the HOME subscale scores and total scores. The HOME scores of the study sample were significantly lower than the

Table 4.11

t Test for Difference Between Means for HOME Inventory

HOME Subscale[a]	Mean		Standard Deviation		t Value T-tail test (df = 102)
	Edmonton Sample[b]	Study Sample[c]	Edmonton Sample[b]	Study Sample[c]	
I.	10.53	9.17	0.87	1.75	2.67* ($p < .005$)
II.	6.91	4.67	0.90	1.56	4.87* ($p < .0005$)
III.	5.72	4.83	0.50	0.72	4.24* ($p < .0005$)
IV.	8.74	8.00	0.78	0.85	2.85* ($p < .005$)
V.	5.69	3.92	0.89	1.88	3.22* ($p < .005$)
VI.	4.53	2.92	0.65	1.16	4.74* ($p < .0005$)
VII.	42.12	33.51	2.77	7.92	3.74* ($p < .0005$)

a HOME Subscale Titles and Possible Scores
- I Emotional and Verbal Responsivity of Mother (0-11)
- II Avoidance of Restriction and Punishment (0-8)
- III Organization of Environment (0-6)
- IV Provision of Appropriate Play Material (0-9)
- V Maternal Involvement with Child (0-6)
- VI Opportunity for Variety in Daily Stimulation (0-5)
- VII Total Score (0-45)

b Represents the age appropriate normative scores of Edmonton families, obtained from NCAST. ($n = 92$)

c Represents the study sample scores. ($n = 12$)

* $p < .01$

Edmonton sample scores. Because of the small study sample size, caution must be employed in interpreting the results of the t test. The findings cannot be generalized to all children who are accidentally poisoned. However, in this study, the greatest differences occurred in the total scores and the following subscales: II, III and VI (Avoidance of Restriction and Punishment, Organization of Environment and Opportunity for Variety in Daily Stimulation, respectively).

Comparison of HOME Scores and Demographic Variables. The Mann-Whitney U-Test was employed to determine if significant differences were present for the HOME scores of the study sample based on the following demographic variables: mother's age, mother's education, father's education, family income, father present in the home, child's sex, family size and recent move. Table 4.12 provides the frequency distributions of these variables. No significant differences ($p > .05$) were found for these variables.

The following values were obtained: mother's age (observed U = 6, tabled U = 2), mother's education (observed U = 11, tabled U = 6); father's education (observed U = 4.5, tabled U = 4); family income (observed U = 17, tabled U = 7); father present (observed U = 16, tabled U = 7); child's sex (observed U = 12; tabled U = 6); family size (observed U = 16, tabled U = 6); and recent move (observed U = 11, tabled U = 6). Near significance was approached for father's education.

Relationship of HOME Scores and Demographic Variables. Correlation coefficients using the Pearson product-moment correlation were obtained between the total HOME scores of the study sample and each of the following variables: mother's education ($r = 0.1999$, df =

Table 4.12

Frequency Distribution of Mother's Age, Mother's Education, Father's Education, Income, Father Present in the Home, Child's Sex, Family Size and Recent Move

Variable	n
Mother's Age	
less than 25 years	2
25 years and over	10
Mother's Education	
less than 12 years	4
12 years and over	8
Father's Education	
less than 12 years	4
12 years and over	6
Income	
less than $20,000	5
$20,000 and over	7
Father Present in Home	7
Child's Sex	
Male	4
Female	8
Family Size	
Only child	4
Recent Move	4

10, p > .05); father's education (r = -0.302, df = 8, p > .05); income (r = -0.122, df = 10, p > .05); and family size (r = 0.197, df = 10, p > .05). No significant relationships were found for any of these variables (p > .05).

The point biserial correlation coefficient was used to test the relationship between the total HOME scores of the study sample and each of the following variables: father present in the home (r = -0.098, df = 10, p > .05); child's sex (r = -0.164, df = 10, p > .05); and recent family move (r = -0.287, df = 10, p > .05). No significant relationships were obtained (p > .05).

The Denver Developmental Screening Test

Developmental assessments of the study children were obtained utilizing the DDST. All of the scores were within the normal range of milestones as determined by Frankenburg et al. (1973). The scoring procedure for this test (counting the number of delays) resulted in seven of the children experiencing no delays and five experiencing one delay or more. Although this scoring procedure resulted in so little variability, a trend was noted in the HOME subscale scores and total scores when the development of the children was categorized as delayed (1 or more delays), normal (no delays or advances), and advanced (1 or more advances). Because of the small sample size, the findings of this trend cannot be regarded as conclusive or generalizable.

Relationship of DDST Scores to HOME Scores. The means and standard deviations for the HOME subscale scores and total scores are presented in Table 4.13 by group and by sex. A high score indicates the more optimal home environment for the child. A trend was noted on

Table 4.13
Means and Standard Deviations for each of HOME Subscales[a] by Group and Sex

Group	HOME I		HOME II		HOME III		HOME IV		HOME V		HOME VI		HOME VII	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
I. Delayed[b]														
Total	7.60	1.52	4.80	2.12	4.60	0.89	8.00	1.00	3.80	1.30	3.00	1.41	31.80	4.15
Boys	7.50	0.71	4.00	2.83	5.00	1.41	7.50	0.71	4.00	1.41	4.00	0.00	32.00	7.10
Girls	7.67	2.08	5.33	2.08	4.33	0.58	8.33	1.15	3.67	1.53	2.33	1.53	31.67	3.06
II. Normal[c]														
Total	10.00	0.82	4.25	0.50	5.00	0.82	7.75	0.96	3.00	2.59	2.50	0.58	32.50	5.20
Boys	10.00	*	4.00	*	5.00	*	8.00	*	0.00	*	2.00	*	29.00	*
Girls	10.00	1.00	4.33	0.58	5.00	1.00	7.67	1.15	4.00	2.00	2.67	0.58	33.67	5.69
III. Advanced[d]														
Total	10.67	0.58	5.00	1.73	5.00	0.00	8.33	0.58	5.33	1.15	3.33	1.53	37.67	1.15
Boys	11.00	*	4.00	*	5.00	*	8.00	*	6.00	*	3.00	*	37.00	*
Girls	10.50	0.71	5.50	2.12	5.00	0.00	8.50	0.71	5.00	1.41	3.50	2.12	38.00	1.41
Total Population	9.17	1.75	4.67	1.56	4.83	0.72	8.00	0.85	3.92	1.88	2.92	1.16	33.51	4.50

a HOME Subscale Titles and Possible Scores
- I Emotional and Verbal Responsivity of Mother (0-11)
- II Avoidance of Restriction and Punishment (0-8)
- III Organization of Environment (0-6)
- IV Provision of Appropriate Play Material (0-9)
- V Maternal Involvement with Child (0-6)
- VI Opportunity for Variety in Daily Stimulation (0-5)
- VII Total Scores (0-45)

b Delayed refers to those children with 1 or more delays in the DDST. (n = 5)
c Normal refers to those children with no delays or advances in the DDST. (n = 4)
d Advanced refers to those children with 1 or more advances in the DDST. (n = 3)
* S.D. - not computed because sample size = 1.

the following four subscales: II, IV, V and VI (Avoidance of Restriction and Punishment, Provision of Appropriate Play Material, Maternal Involvement with Child and Opportunity for Variety in Daily stimulation, respectively) with the advanced group receiving the highest scores, followed by the delayed group and then the normal group. The trend differed on two subscales. On Subscale I: Emotional and Verbal Responsivity of Mother, the advanced group ranked first, the normal group second and the delayed group last. On Subscale III, Organization of Environment, the advanced and normal groups ranked first with identical scores, followed by the delayed group. Three children who had high HOME scores of 37, 37, and 39, respectively, also showed advances in the DDST: one child in each of the personal-social, language, and gross motor sectors; one child in the language sector; and, one child in each of the personal-social and gross motor sectors.

Relationship Between Time Taken to Complete DDST and Developmental Delays. Although it usually takes an average time of 20 minutes to administer the DDST, the investigator found that some children took much longer to respond (30 to 40 minutes), while others responded more quickly (10 minutes). It is noteworthy that three of the six children who took longer to complete the DDST displayed one delay each in the personal-social sector. A fourth child had one delay in each of the fine-motor adaptive and gross motor sectors. A fifth child had one delay in the gross motor sector. These six children appeared more reluctant to respond; were easily distracted by other things in the room; revealed a shorter attention span; and, were frequently described by their mothers as "very active".

Other Factors

Other factors that could represent an important variable within the life of the child who is accidentally poisoned are presented in Table 4.14. During the open interview of the HOME, these factors were perceived to pose a potential risk for the study children.

Underestimation of the Child's Ability. Although two mothers had underestimated their child's ability to open a child-resistant container, this factor was considered by the investigator to be contributory in only one episode of accidental poisoning. Combinations of two or more factors were considered to be responsible in 10 (83.3 percent) of the study cases. These factors will be discussed in the following section.

Family and Environmental Factors. An older sibling played an important part in one poisoning accident. The mother stored children's tylenol tablets in a child-resistant container in a kitchen cabinet six feet above floor level. While she was occupied taking a shower, the 33-month old child climbed onto the chair, obtained the tablets and shared them with her 19-month old brother. The mother of these two children was also pregnant. She expressed dissatisfaction with her role as a mother because of heavy continuous child care responsibility. She reported a limited and detached relationship between the children and their father whom she said never helped care for the children and never took them anywhere. This mother also cited social isolation factors such as little or no opportunity to get away from the children and limited companionship and social activities (for example, the ability to join clubs or organizations). It is noteworthy

Table 4.14

Number of Mothers Reporting Potential Risk Factors in the Lives of the Sample of Children Accidentally Poisoned

Factor	Number of Reports
Family Factors	
Insufficient income	4
Heavy continuous child care responsibility	3
Separation	1
Pregnancy	2
Recent employment of mother	1
Older sibling involved	1
Environment factors	
Recent move	4
Crowding	4
Social isolation	4
Parental factors	
Lack of knowledge of toxicity of substance	2
Underestimation of the child's ability	2
Neglected supervision/carelessness	8

that the younger child ingested a poinsettia leaf at six months of age. Both these siblings had low HOME scores, one scoring 27 and the other 29.

Two of the poisoning accidents occurred with persons other than the parents. One accident involved a 17-month old child visiting his grandparents. This child ingested aftershave which was stored in a carton on the floor in the front porch. The mother was conversing with the grandparents in the kitchen. The mother reported that the child ingested a devil's ivy leaf at 10 months of age. She also reported that the child ingested javex bleach after data collection was completed. This was a single parent who also cited social isolation factors and complained about her present standard of living with regard to overcrowding and income. She had changed accommodation within two months of the poisoning accident. The child had a low HOME score of 29.

The second poisoning accident with persons other than the parents occurred with the babysitter. A babysitter left anacin tablets on the kitchen table. While she was playing with two other children, a 27-month old child ingested the tablets. The mother stated that she was not surprised that her child had taken the medication as he was going through a difficult time since his father had only recently (within two months) separated from the mother. because of the separation the mother and child moved to a new location. This child had a high HOME score of 37.

Neglected Supervision and Lack of Knowledge. Finally, neglected supervision or carelessness was undoubtedly an important factor in eight of the poisoning accidents. Examples would include: (1) A mother left bactrim suspension on the kitchen counter. While she was

occupied doing the laundry and starting supper, her 21-month old child swallowed the antibiotic. The child had a high HOME score of 37. (2) A mother stored a container of Diaparene towels on a chair in the child's bedroom; the 16-month old child swallowed the liquid from the container. The child had a HOME score of 31. (3) A mother left her anacin tablets on the kitchen counter; a 21-month old child ingested them while the mother was sleeping. The child's HOME score was 29. (4) A mother left her birth control pills on the bathroom counter. Her 41-month old child obtained the pills and ate them. The child vomited repeatedly, but the mother claimed that she was told by a friend that an overdose of birth control pills was harmless. The child was treated in the emergency department 12 hours later. The child had a HOME score of 32.

Summary

In summary, the findings from the study include the following:

1. Characteristics of the Sample of Parents and Their Children - Most of the parents were between 25-34 years of age. All of the parents were white except for one child's parents who were black. The parents of four of the children were not living together because of separation or divorce. The mothers averaged 12.5 years of schooling (standard deviation = 3.03, range = 9 - 19 years), whereas the fathers averaged 14.4 years of schooling (standard deviation = 3.92, range = 10 - 20 years). The median income category of the families for the year before taxes was $24,999.50

Eight (66.7 percent) of the children were females. The mean age of the children was 25.1 months (standard deviation = 8.82, range = 12

- 41 months). Only children accounted for one-third of the sample. Two (16.7 percent) of the target children had been poisoned previously and there were three episodes (25.0 percent) of sibling poisoning amongst the families studied.

2. Characteristics of the Poisonous Substances Ingested and Events Surrounding the Poisoning Accident - Drugs accounted for eight (66.7 percent) of the ingested substances. In three cases (25.0 percent) the poisonous substance was in a child-resistant container.

Ten (83.3 percent) of the poisoning accidents occurred in the child's own home, with the kitchen being the most common location (n = 7). The poison was left within easy access of the child in ten (83.3 percent) of the cases. Seven (58.3 percent) of the poisoning accidents occurred at mealtimes between 11:45 a.m. and 12:45 p.m. and between 5:30 and 6:30 p.m. Three (25.0 percent) of the poisonings occurred on Monday, whereas four (33.3 percent) occurred during the weekend. The person responsible for the child at the time the poison was ingested was most often (n = 11) the child's mother.

3. Parental Knowledge About Poisons - Nine (75.0 percent) of the mothers indicated that they had received information on poisons and poison prevention. Eleven (91.7 percent) of the mothers, upon discovering that their child had ingested poison, immediately contacted a professional resource person. The number of mothers who employed first-aid measures at the time of the accident was three (25.0 percent).

4. Characteristics of the Children's Home Environment - The mean HOME score of the sample was 33.51 (standard deviation = 7.92, range = 27 - 40). When comparing the HOME scores of the normative Edmonton

sample with the HOME scores of the study sample, the one-tailed t test was significant at the $p < .005$ level. The scores of the study sample were significantly lower than the Edmonton sample scores. The greatest differences occurred in the total scores and three subscales: II - Avoidance of Restriction and Punishment, III - Organization of Environment and VI - Opportunity for Variety in Daily Stimulation.

5. Relationship Between HOME Scores and Demographic Variables - The relationship between the HOME scores and selected demographic variables were analyzed utilizing the Mann-Whitney U-Test of significance and the Pearson product moment and the point biserial correlation coefficients. No significant relationships ($p > .05$) were found between these variables.

6. Characteristics of the Children's Developmental Status - Using the DDST, all of the children were identified as normal for development when compared to the standardized scores. One-half of the children were described by their mothers as "very active". Five of these children showed one or more delays in the DDST.

7. Comparison of Children's DDST Scores to HOME Scores - When development utilizing the DDST was categorized as delayed, normal and advanced, the advanced group received the highest HOME scores in four subscales: II - Avoidance of Restriction and Punishment, IV - Provision of Appropriate Play Material, V - Maternal Involvement with Child and VI - Opportunity for Variety in Daily Stimulation; followed by the delayed group and then the normal group. On Subscale I - Emotional and Verbal Responsivity of Mother, the advanced group ranked first, the normal group second and the delayed group last. On

Subscale III - Organization of Environment, the advanced and normal groups ranked first with identical scores, followed by the delayed group.

8. Potential Risk Factors - Twelve factors were identified that could represent potential risks to the children. These factors were: (a) insufficient income, (b) heavy continuous child care responsibility, (c) separation, (d) pregnancy, (e) recent employment of mother, (f) older sibling involved, (g) recent move, (h) crowding, (i) social isolation, (j) lack of knowledge, (k) underestimation of child's ability, and (l) neglected supervision/carelessness. At least two of these factors were present in ten (83.3 percent) of the poisoning episodes.

The data presented within this Chapter do not represent a comprehensive analysis of the problem of accidental poisoning in children 1-4 years of age because of the size of the sample and the absence of a control group. The certainty and scope of the findings are limited by these constraints. The results of this study must therefore be treated with caution when considering other populations. While the data presented appear to indicate major differences between the HOME scores of the age appropriate normative sample and the study sample, they also indicate potential differences within the study sample. The findings cannot, therefore, be generalized beyond the children in the study.

CHAPTER 5

DISCUSSION, CONCLUSIONS, IMPLICATIONS AND RECOMMENDATIONS

This study was designed to explore some of the possible environmental factors contributing to the accidental poisoning of children 1-4 years of age and to examine the relationship between these factors and the developmental state of the children who ingested the poison.

In this final chapter the discussion of the results of the study and the conclusions are presented. The limitations, the implications for nursing and the recommendations are considered.

Discussion of the Results

The results of this study suggest that accidental poisoning in early childhood may be viewed as the interaction of a number of underlying factors. These factors are presented and the findings discussed in this section.

Characteristics of the Parents. The major characteristics of the parents are summarized in Table 4.1. The results of the study suggest that demographic and socioeconomic status variables including mother's age, mother's education, father's education, family income, father's presence and family size have no bearing on whether a child takes poison or not. These results concur with those reported in earlier studies (Jackson et al., 1968; Katz, 1976; Lewis et al., 1966; Margolis, 1971; Shaw, 1977; Sobel, 1970). A few researchers (Craft, 1975; Eriksson et al., 1979) reported that childhood poisoning occurred

most frequently in lower class families. However, these researchers acknowledged that this finding, although significant, was not great. Further, Shaw (1977) documented no statistical relationship between poisoned children's and control children's parents in terms of race. In the current study, there was only one non-Caucasian family; therefore, it was not possible to control for ethnicity.

Characteristics of the Children. The major characteristics of the children are presented in Table 4.2. These characteristics include sex, age, family size and repeat poisonings. The personality and behavioural characteristics of the children will also be discussed.

Eight (66.3 percent) of the children were females. The preponderance of females is considerably higher than reported in previous studies. Most researchers reported a significantly higher proportion of poisoning in males than in females (Allingham, 1975; Basavaraj & Forster, 1982; Buffoni et al., 1981; Deeths & Breeden, 1971; Gehlbach & Wall, 1977; Sobel, 1970). Other researchers reported no significant difference for the child's sex (Beautrais et al., 1981; Craft & Sibert, 1977; Mahdi et al., 1983; Silva et al., 1978). Because of the very small sample size, caution must be utilized in viewing the finding of this study with regard to the sex of the child.

The age distribution of the children showed that ten (83.4 percent) were between the ages of 13 months and 37 months with a mean age of 25.1 months. This result is in accord with the findings of other researchers (Buffoni et al., 1981; Gehlbach & Wall, 1977; Gill et al., 1976; Hancock, 1973; Jackson et al., 1968; Valman, 1982) who found that children between one and three years of age were at greatest risk

for accidental poisoning. This age represents the period during which the child starts to walk and to show curiosity in his environment by using all of his senses. Because he has received gratification through sucking and taste as an infant, he logically continues to use this modality to explore the environment (Lybarger, 1977). The young child is therefore prone to ingest some of the potential toxins available in the home. Finally, young children are not aware that they can harm themselves in this way as they lack the knowledge and experience to understand the consequence of their action.

Four (33.3 percent) of the children in the study were only children. A further six children (50.0 percent) had only one sibling each. This finding disagrees with many researchers who reported that only children are less likely to be poisoned than those children with several siblings (Allingham, 1975; Basavaraj & Forster, 1982; Craft, 1975; Hancock, 1973; Jackson et al., 1968; Shaw, 1977). On the other hand, Sobel (1970) reported no relationship between poisoning and the number of siblings. Additional caution in viewing the result of this study with regard to family size is required because of the sample size.

Two (16.7 percent) of the target children had previous episodes of poisoning and there were also three (25.0 percent) episodes of sibling poisoning, a total of 41.7 percent of previous poisoning relating to the study group. The finding does not concur with other researchers (Allingham, 1975; Jones, 1980) who contended that the incidence of repeat poisonings was very low (6.0 percent). The finding from this study suggests that the learning produced by a single episode of poisoning is not of a very high order.

It has been documented in the literature that a higher proportion of poisoned children were considered to be more active than children in a control group (Baltimore & Meyer, 1969; Eriksson et al., 1979; Margolis, 1971; Sibert & Newcombe, 1977; Sobel, 1970). No specific attempt was made in this study to evaluate the child's activity level. However, it was found that six of the children took longer to complete the DDST because they were easily distracted and had a short attention span. These children were also described by their parents as being "very active". It would appear that the child's behavioural characteristic of high activity is a relevant factor in childhood poisoning.

Characteristics of the Poisonous Substances. The toxic substances involved in the poisoning episodes in this study were similar to those reported by the previous researchers (Buffoni et al., 1981; Craft & Sibert, 1977; Hancock, 1973; Lawson et al., 1983): the majority of poisonings occurred with medicines (66.7 percent).

The literature review provides research support for the effectiveness of child-resistant containers in the prevention of childhood accidental poisonings (Craft & Jackson, 1977; Done et al., 1971; Mofenson & Greensher, 1978; Scherz, 1970). Although the overall effectiveness of child-resistant containers has been clearly shown, the poisonous substance was stored in such a container in three instances of poisoning in this study. This finding raises two questions: (1) How did the three children who were poisoned gain access to the substance? and (2) Did they actually open the containers or were the lids defective or not closed properly? In one instance, that involved

two subjects, a 33-month old female child climbed onto a chair and obtained children's tylenol tablets from a kitchen cabinet six feet above floor level. She then shared the tablets with her 19-month old brother. The third subject was a 33-month old female who obtained children's aspirin tablets from the top of a bedroom dresser three feet above floor level. In the third case it would appear that the location of the poisonous substance was too readily accessible to the child. Child-resistant containers should not be expected to substitute for the basic safety measures fundamental to the prevention of poisoning in children. All poisonous substances and medicines must be kept out of the reach of children.

In this study the researcher found that ten (83.3 percent) of the poisoning accidents occurred in the child's own home. This finding is supported by earlier studies (Allingham, 1975; Eriksson et al., 1979). More than half (58.3 percent) of the episodes occurred in the kitchen and the kitchen was the most common indoor site (41.7 percent) for the storage of poisonings. This finding is in agreement with that of other researchers (Buffoni et al., 1981; Govaerts-Lepicard, 1981). It is evident that the kitchen is the place where potentially toxic products are most often stored. In this study one case of poisoning (8.3 percent) occurred in the grandparent's home, a point that has also been emphasized by Craft (1975) and Sibert (1975).

The results of this study showed that a major factor in the poisoning of children was that poisonous substances were too readily accessible to them. This finding is in agreement with that of other researchers (Craft, 1975; Jackson et al., 1968; Scherz, 1970). More than one-half (58.3 percent) of the ingestions occurred when the

product was not stored safely. The poison was within the child's reach in about one-half the cases because it was temporarily not in its proper place. In this study it was clear that for most poisonings the usual place of storage for the poison was irrelevant to the actual poisoning. This finding suggests that greater emphasis must be placed on pointing out the need for parents to be aware of and vigilant about the dangers of poisons left lying around the child's environment. The aspect of responsibility is clear. Poisons must be put away immediately after use. Children must be watched and not left alone in a potentially dangerous situation.

Events Surrounding the Poisoning Accident. Two peaks of frequency in the number of ingestions were found, one between 11:45 a.m. and 12:45 p.m., and the other between 5:30 and 6:30 p.m., when four (33.3 percent) and three (25.0 percent) of the cases in this study occurred. The midday peak agrees with that reported by Shaw (1977). However, several researchers documented variation in poisoning occurence by hour of the day with morning (Craft & Sibert, 1977; Hancock, 1973; Shaw, 1977) and evening (Hancock, 1973; Greenberg & Osterhout, 1982a) peaks also observed. The two peaks in this study suggest strong environmental correlates. The peaks occurred at mealtimes and might reflect the hours during which the child was hungry. This finding suggests that supervision of childhood activity around mealtimes should be emphasized (Buffoni et al., 1981; Greenberg & Osterhout, 1982a). Therefore, anticipatory guidance to parents should include information on the hours of greatest poisoning risk. The two peaks appear to be related to the fact that these are the times

when lunch and supper are being prepared and when the mother may be occupied with the other members of the family. However, in only one case in each peak was the mother preparing a meal.

The greatest number of accidents occurred on Mondays (n=3), with equal representation (n=2) on Fridays, Saturdays and Sundays. Hancock (1973) and Craft and Sibert (1977) found no significant difference in the number of ingestions occurring on various days of the week although some researchers reported small increases on Mondays and Thursdays (Sibert, 1975); Mondays, Tuesdays and Wednesdays (Shaw, 1977); and Wednesdays (Buffoni et al., 1981). The results of this study are inconclusive given the small sample as this distribution must be considered to have potentially occurred by chance. It was not possible to determine whether seasonal trends were evident (for example, whether more cases of accidental poisonings occurred in the winter when the children were kept indoors) as the period of study covered only the months of June, July and August. Greenberg and Osterhout (1982b) reported that preschool children have a September through November poisoning peak.

The findings relating to the child's caretaker confirm those of previous researchers (Allingham, 1975; Beautrais et al., 1981; Shaw, 1977). In most cases (11 of the 12) the child's mother was either solely or jointly responsible for the child when the accident occurred. As previously reported, in only two cases was the mother busy preparing meals for the family. In the remaining ten cases she was involved in a variety of activities including taking a shower, talking to a spouse, and gardening. Eleven (91.7 percent) of the

children poisoned in this study took the substance of their own accord. One child was given the substance by an older sibling and in no instance was the substance given by an adult. Some researchers (Allingham, 1975; Beautrais et al., 1981; Shaw, 1977) have reported that a distraction was alleged to have taken the mother's attention away from the child, resulting in accidental poisoning. However, a distraction was not found to be a primary cause of poisoning in the current study. Neglected supervision of the preschool children or carelessness about potentially dangerous substances was undoubtedly an important factor in eight (66.7 percent) of the poisoning accidents. The latter finding concurs with reports of previous researchers (Basavaraj & Forster, 1982; Jackson et al., 1968).

Parental Knowledge. Investigators (Allingham, 1975; Eriksson et al., 1979; Shaw, 1977) frequently stressed parental ignorance of the potential toxicity of medicines and household products as a cause for inadequate storage of the substances. Findings from this study indicate that the overall quality of parental knowledge was good, as demonstrated by the fact that ten of the twelve mothers of the poisoned children knew the agents were poisonous before the accidents occurred. In addition, eleven of the mothers immediately contacted a professional resource person when they discovered their child had ingested poison (Table 4.7). However, only three mothers utilized first aid measures. It would appear that in this study the majority of the parents were aware of whom to contact but were generally unaware of the procedures to carry out at home to treat the poisoning. In response to the questionnaire, three (25.0 percent) of the mothers stated that they had

not received information on the topic of poison and poison prevention. This figure is considerably lower than the finding of 54 - 68.0 percent reported by Eriksson et al. (1979).

For the nine parents who reported that they had received information, there was great variability in the time at which they received it. The mothers received the information on poisons and poison prevention prenatally, postnatally, when the child was three, six and nine months of age, and after the poisoning accident. The optimum time at which parents should receive counselling about accidental ingestion of poisonous substances has yet to be investigated by researchers.

Characteristics of the Children's Home Environments. The home environments of the children were assessed utilizing the HOME tool. Significant findings ($p < .01$) were found when t tests were used to compare the differences in means for the study sample and the Edmonton sample. The HOME scores were significantly lower for the study children. The greatest differences occurred in the total scores and the following subscales: II - Avoidance of Restriction and Punishment, III - Organization of Environment and VI - Opportunities for Variety in Daily Stimulation.

The HOME tool has been used to compare the environments of children at risk for developmental delays with normal control groups. Significant differences favouring the control groups were found on all subscales of the HOME. Largest differences were reported in II - Avoidance of Restriction and Punishment (Wulbert et al., 1975) and III - Organization of the Environment (Piper & Ramsay, 1980). These

findings are in accord with those found in the current study.

Avoidance of Restriction and Punishment. The HOME subscale II (Avoidance of Restriction and Punishment) scores were consistently lower for the study children. This subscale looks at ways in which the mother may or may not restrict and punish the child during the visit. While restrictiveness and control are necessary to protect the young child, too much could be a negative influence and result in more accidents (Eyres, Hammond & Barnard, 1979). Children under supervision must be allowed to engage in some risk-taking behaviour in order to learn consequences and to internalize behaviour controls. The study findings suggest that the home environments did not support independence because they were relatively over-restrictive.

Relationship Between Child Characteristics and Home Environmental Characteristics. Rose and Killien (1983) stated that the characteristics of both the individual and the environment contribute to health or illness. They cited the study of childhood accidents by Eyres et al. (1979) as an example of the interaction between the characteristics of the child and the characteristics of the home environment. Eyres et al. (1979) used data from the first three years of a longitudinal study of 153 firstborn children to determine: (a) whether serious accidents during the first three years of life were related to the characteristics of the home environment, and (b) whether there was an interaction between child and environmental characteristics as they related to serious accidents. The 20 children who had two or three medically attended accidents by age three (accident repeaters) were compared with the 133 children who had one accident or none by

that age (accident non-repeaters). The accident repeaters were more advanced in their gross motor development at one year of age. They also had significantly more deviant behaviour (hyperactivity-distractability) at age three reported by the mothers. When the quality of the home environment was measured using the HOME, an additional relationship to accidents was found. Accident non-repeaters had higher scores on the subscales II - Avoidance of Restriction and Punishment and V - Maternal Involvement with Child. A significant interaction was found between accidents and the degree of motor development and environmental restriction at one year of age. Children with advanced gross motor development in restrictive environments were more likely to have repeated accidents than were children with normal or delayed gross motor skills in less restrictive environments.

In the current study, ten (83.3 percent) of the children had not previously been poisoned. These children had higher scores on Subscale II (mean = 5.0, range = 3 - 7, number of items = 8) than the two (16.7 percent) children with repeat poisoning (mean = 3.0, range = 2 - 4). This finding concurs with that reported by Eyres et al. (1979). However, the two children with repeat poisoning did not have advances in gross motor skills. The two children with advanced gross motor development had scores of 4 and 7 on Subscale II which indicate great variability in environmental restriction.

Organization of the Environment. Subscale III - Organization of the Environment, assesses: (1) the regularity and predictability of the environment for the child, (2) the basic requirements for health and safety practices necessary for a young child to develop normally

and (3) whether the environment offers the necessary conditions for growth and development (Caldwell & Bradley, 1984). The scores on this subscale were significantly lower ($p < .0005$) for the study children. This finding indicates that the parents did not adequately organize the home environment and provide the children with the basic safety requirements. Caldwell and Bradley (1984) reported that HOME scores appear to be significantly related to measures of cognitive development taken in early childhood. Six-month HOME scores (particularly Organization of the Environment) showed an even stronger relationship to 36-month and 54-month Binet scores. The low scores on this subscale suggest that the study children are at risk for decreased cognitive development.

Opportunities for Variety in Daily Stimulation. Subscale VI - Opportunities for Variety in Daily Stimulation, is distinctive in that this subscale is the only one on the HOME assessing the father's presence in the home and his involvement in the child's care. With the HOME assessment, it was found that the father was either absent from the home and/or not involved in his child's care in eleven (91.7 percent) of the families. This finding would appear to concur with that of Katz (1976) who suggested that the absence of one parent from the home was an important stress factor in childhood poisoning.

According to Lewis et al. (1966), a desirable state of family organization is one that reflects the capacity of the family to organize the environment in a manner that helps the child to avoid danger at the same time as it permits the facilitation of the child's development. They suggested that the factor that repeatedly impaired

this organizing ability in the families studied was the decrease in psychologic assistance given to the family, especially the mother, by the child's father. The effects of father absence may be due to a number of interacting factors including the manner in which the mother copes with the problems caused by the father's absence, the reasons for his absence, the support provided by relatives and friends, the length of time of separation, socioeconomic status and number of siblings (Hetherington & Deur, 1972). Father absence and/or lack of involvement with the children in this study were due to a variety of factors including separation (n = 2), divorce (n = 2), occupational demands (n = 5) and a limited relationship between the children and their father (n = 2), as reported by the mother. Hetherington and Deur (1972) suggested that the home broken by separation can have unhappy consequences for the children and cause a depletion of maternal emotional resources. One mother who separated from the father within two months of the accident reported that she was not surprised that her 27-month old son had ingested poison because he was very unhappy. The boy no longer had a close relationship with his father who had moved to a different city. A depletion of maternal emotional resources might be reflected in either attention-seeking devices (Sobel & Margolis, 1965) or self-destructive responses (Lewis et al., 1966) on the part of the child. These previous findings appear to support those of the current study. Father absence appears to be associated with a wide range of disruptions in social and cognitive development, particularily if the father leaves the home during the preschool years (Hetherington & Deur, 1972). Father-absent boys are more impulsive, less self-controlled,

and less able to delay immediate gratification than father-present boys. However, the behaviour of father-absent and father-present girls show few differences in the preschool years (Hetherington & Deur, 1972). Because father absence and/or lack of involvement were found in eleven of the study homes, this may have been one variable partially responsible for the significant differences ($p < .005$) in the HOME scores between the study group and the Edmonton group.

Environmental Risk Factors. In the present study, risk factors (Table 4.14) were identified as important in accidental ingestion of poisons in young children. This finding concurs with those reported in both prospective (Sibert, 1975) and retrospective (Margolis, 1971; Sobel, 1970) studies of childhood poisoning. Two of these factors, a recent change in residence (within 2 - 4 months) and crowded living conditions, occurred frequently (in four instances each) amongst the families studied. These results are in accord with the findings of other researchers (Dershewitz & Christopherson, 1984; Sibert, 1975) who suggested that it is likely that both these factors create a chaotic environment and compromised supervision, thus creating an atmosphere conducive to accidents.

Characteristics of the Children's Developmental States. The children compared favourably to the standardization population in the four skill areas of the DDST: personal-social, fine motor-adaptive, language and gross motor. Because the usual scoring procedure resulted in so little variability, it was not possible to make comparisons within the group. An alternative scoring method was employed. An alternative scoring method has also been developed by other researchers (Eyres, Barnard & Gray, 1979; Stanislawski, 1977) because the DDST

makes no finer gradation in scoring than "abnormal", "questionable" or "normal" development. Stanislawski (1977) reported that the standard scoring of the DDST did not always detect delayed development in the study sample although the alternative method of scoring facilitated differentiation of the delayed from the normal child. She also reported that the alternative method differentiated normal development into two levels, normal and advanced development, facilitating analysis of the effect of the environment on the child with the use of the HOME tool.

In the current study, the alternative scoring method resulted in a differentiation of the children into advanced, normal and delayed development, and enabled comparison of the children's HOME scores. Children with advanced development received the highest total HOME score followed by the children with normal and then delayed development.

Frankenburg, Dick and Carland (1975) suggested that children beyond 1.5 to 2 years of age from the middle socioeconomic class tend to excel especially in personal-social skills and language development because of the emphasis on parent-child interaction. However, two of the three children with advances in either one or both of these sectors were from the low socioeconomic class. It is interesting to note that all three children had relatively high HOME scores of 37, 37 and 39.

Conclusions

Based on the findings the following conclusions can be made:

1. Differences in demographic and socioeconomic status variables were detected among a sample of parents of twelve children aged 1 - 4

years treated for accidental poisoning. This finding is in accord with most researchers: demographic and socioeconomic status variables have no bearing on whether a child takes poison or not. However, a number of differences from the findings of other researchers were noted among the sample of children. Among the study results which differed from the findings of other researchers were the preponderance of females, the higher proportion of only children and children with one sibling, and the high incidence of repeat poisonings relating to the study group. No conclusions can be made on the basis of these findings because the sample size was small and was chosen for convenience.

2. The characteristics of the poisonous substances ingested by the children and the majority of the events surrounding the poisoning accident were similar to those reported previously.

3. Parental knowledge about poisons was greater than that reported by previous researchers

4. The children's HOME scores were significantly lower ($p < .01$) than the scores of an age appropriate normative sample of Edmonton children. It would appear that the home environments of children who are accidentally poisoned pose a risk, particularily in the ways the mother restricts and punishes the child and organizes the environment. Additional caution is required in viewing the HOME results from this study. Despite the availability of normative data for the sample residing in the area from which the data were drawn, the absence of a control group and the size of the sample limit the scope of these findings. The present HOME results are tentative and in need of additional examination.

5. The children were normal for development in personal-social, fine motor-adaptive, language and gross motor skills. Administration of the DDST revealed that six (50.0 percent) of the children were very active.

6. No significant relationships ($p > .05$) were found between the HOME scores and selected demographic variables. The alternative scoring method of the DDST resulted in a differentiation of the children into advanced, normal and delayed development and allowed for comparisons to be made within the sample. The advanced group received the highest HOME scores, then the normal group and the delayed group.

Utilization of the HOME and the DDST assessed different aspects of the children's development. The intent of the HOME subscales: III - Organization of the Environment, IV - Provision of Appropriate Play Material and V - Material Involvement with the Child, is to assess the mother's knowledge of child development and her attempts to promote it. Administration of the DDST with the HOME gives the researcher an opportunity to objectively assess the mother's ability in this area (Stanislawski, 1977). Parents were generally very interested in the DDST, and the combination of the HOME and the DDST promoted much discussion between the mothers and the researcher about development.

Limitations

The study was limited by the following factors:

1. The sample was small and chosen on a convenience basis. Only those children who presented for treatment of accidental poisoning in the emergency department of a large university teaching hospital and who lived in the Greater Edmonton area were surveyed. Thus, the

results of the study cannot be generalized beyond the children in the study.

2. It was impossible to control for antecedent events and conditions that prevailed at the time of the home visits. The presence of the investigator may have resulted in distorted parental responses.

3. The parents voluntarily participated in the study and their responses may not have reflected the population as a whole. Prospective subjects are more likely to volunteer to participate in a study when there is an increase in their subjective probability of being evaluated favourably by the researcher (Rosenthal, 1970). This may have resulted in underestimation of benign and illicit substances.

4. The findings could be confounded by seasonal variations. Had other months been considered besides June, July and August, the results might not have been similar to those described.

Implications for Nursing

The study results have implications for nurses in establishing intervention programs for families in order to prevent the accidental poisoning of vulnerable preschool children. Parents appear to be in need of guidance based on the child's age and stage of development to prevent poisonings in children.

The use of the HOME tool with the DDST would appear to be useful for every nurse who works primarily with the pediatric population in order to facilitate the identification of children at risk for poisoning. According to Stanislawski (1977), the combination of these two tools is advantageous in that the DDST allows the nurse to observe

what the mother knows about development and the HOME allows the nurse to observe how the mother attempts to foster development. Thus, the HOME provides a measure of the environment as the intervening variable.

The use of the HOME with the DDST is imperative for several reasons: (1) to stimulate questions about development from parents; (2) to involve parents in program planning especially if intervention necessitates modification of the environment; (3) to serve as teaching tools about parenting and child development; and, (4) to determine where intervention is required (Stanislawski, 1977). Assessment of the child's environment and developmental status could serve to help the nurse plan and provide anticipatory guidance to parents and help to decrease the number of children who are poisoned.

Although ultimately it is the parents' responsibility to protect the child, nurses must continue to take responsibility for promoting the optimal functioning of each child (Tudor, 1977). Nurses, particularly those in the community, are in a most favourable position to assist parents in meeting the health and safety hazards associated with every phase of development. Through their contacts with parents at prenatal classes and well-child visits, community health nurses, in anticipation of children's exploratory behaviour and mobility, can take an active part in teaching parents about common household poisons, poison-proofing the home and appropriate first-aid measures. Through their informal access to families in their own homes, community health nurses have the valuable and unique opportunity to detect dangers in the environment and to relate general principles to specific families. For example, the community health nurse is able to survey the

environment for toxic plants, such as Dieffenbachia, and to subsequently advise parents to keep such plants out of reach of children.

Emergency room nurses can also play an important role in poison prevention. They are in a position to prevent a repeat poisoning by effectively communicating principles of safety to the parents, such as the need to return poisons to their proper storage place, and by referral to the Local Health Authority. This referral enables the community health nurse to make a follow-up telephone call or home visit to assure the future safety of the child and others in the family.

The study results indicated that childhood poisoning is largely a preventable occurrence to a vulnerable group. Nurses have a role in all health care settings with reference to helping parents increase the wellness potential of their child's environment. Health care costs can be reduced and stress and pain to the child and family can be further prevented by continually assessing both the child's environment and the child's developmental status.

Recommendations

There is a need to replicate the present study and to overcome the associated limitations. Therefore, the following recommendations are proposed:

1. Conduct the study in other emergency departments and in other geographic locations in order to determine trends and make comparisons. If the results from other such studies were similar to the findings of this study, then the latter could be considered

generalizable to children who are accidentally poisoned.

2. Increase the sample size, select children randomly and introduce a control group. Increased sample size increases the power of the statistical tests and may result in significance for some findings. Random selection increases the representativeness of the population and the subsequent generalizability of the findings. The presence of a control group increases the probability that the differences between the study and control groups are a result of the accidental poisoning.

3. Select participants from random months of the year, thereby increasing the possible seasonal representativeness of the substances ingested.

4. Utilize tools to assess the child's personality characteristics and family stress factors. Examination of the child's personality characteristics could result in identifying those children who have characteristics which predispose them to an increased risk of poisoning and/or repeat poisoning. Further investigation of family stress factors, in particular, the amount of support offered by the father and the degree of his involvement with the child's care, could result in a more adequate determination of the role of these factors in childhood accidental poisoning and the means by which these factors predispose to poisoning and/or poison repetition.

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APPENDIX 1

HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT (BIRTH TO THREE YEARS)

HOME OBSERVATION FOR MEASUREMENT OF THE ENVIRONMENT
(Birth of Three Years)

I. EMOTIONAL AND VERBAL RESPONSIVITY OF MOTHER	Yes	No
1. Mother spontaneously vocalizes to child at least twice during visit (excluding scolding).		
2. Mother responds to child's vocalizations with verbal response.		
3. Mother tells child the name of some object during visit or says name of person or object in a "teaching style".		
4. Mother's speech is distinct, clear and audible.		
5. Mother initiates verbal interchanges with observer - asks questions, makes spontaneous comments.		
6. Mother expresses ideas freely and easily and uses statements of appropriate length for conversations (e.g. gives more than brief answers).		
*7. Mother permits child occasionally to engage in "messy" types of play.		
8. Mother spontaneously praises the child's qualities or behavior twice during visit.		
9. When speaking of or to child, Mother's voice conveys positive feeling.		
10. Mother caresses or kisses child at least once during visit.		

* Items which may require direct questions.

		Yes	No
11.	Mother shows some positive emotional responses to praise of child offered by visitor.		

Subscale Total (No. of Yes Answers) _____

II.	AVOIDANCE OF RESTRICTION AND PUNISHMENT	Yes	No
12.	Mother does not shout at child during visit.		
13.	Mother does not express overt annoyance with or hostility toward child.		
14.	Mother neither slaps nor spanks child during visit.		
*15.	Mother reports that no more than one instance or physical punishment occurred during the past week.		
16.	Mother does not scold or derogate child during visit.		
17.	Mother does not interfere with child's actions or restrict child's movements more than 3 times during my visit.		
18.	At least ten books are present and visible.		
*19.	Family has a pet.		

Subscale Total (No. of Yes Answers) _____

III. ORGANIZATION OF ENVIRONMENT	Yes	No
20. When Mother is away, care is provided by one of three regular substitutes.		
21. Someone takes child into grocery store at least once a week.		
22. Child gets out of house at least four times a week.		
23. Child is taken regularly to doctor's office or clinic.		
*24. Child has a special place in which to keep his toys and "treasures."		
25. Child's play environment appears safe and free of hazards.		

Subscale Total
(No. of Yes Answers) _____

IV. PROVISION OF APPROPRIATE PLAY MATERIAL	Yes	No
26. Child has some muscle activity toys or equipment.		
27. Child has push or pull toy.		
28. Child has stroller or walker, kiddie car, scooter or tricycle.		
29. Mother provides toys or interesting activities for child during interview.		

		Yes	No
30.	Provides learning equipment appropriate to age - cuddly toy or role playing toys.		
31.	Provides learning equipment appropriate to age - mobile, table and chairs, high chair, play pen.		
32.	Provides eye-hand coordination toys - items to go in and out of receptacle, fit together toys, beads.		
33.	Provides eye-hand coordination toys that permit combinations - stacking or nesting toys, blocks or building toys.		

Subscale Total
(No. of Yes Answers) _____

V.	MATERIAL INVOLVEMENT WITH CHILD	Yes	No
35.	Mother tends to keep child within visual range and to look at him often.		
36.	Mother "talks" to child while during her work.		
37.	Mother consciously encourages developmental advance.		
38.	Mother invests "maturing toys" with value via her attention.		
39.	Mother structures child's play periods.		

		Yes	No
40.	Mother provides toys that challenge child to develop new skills.		

Subscale Total (No. of Yes Answers) _____

VI.	OPPORTUNITIES FOR VARIETY IN DAILY STIMULATION	Yes	No
41.	Father provides some caretaking every day.		
42.	Mother reads stories at least three times weekly.		
43.	Child eats at least one meal per day with Mother and Father.		
44.	Family visits or receives visits from relatives (approx. once a month).		
45.	Child has three or more books of his own.		

Subscale Total (No. of Yes Answers) _____

Enter Totals for Each Category

Emotional and Verbal Responsivity of Mother

Avoidance of restriction and punishment

Organization of Environment

Provision of Appropriate Play Material

Maternal Involvement with Child	Yes	No
Opportunities for Variety in Daily Stimulation		

Total Score
(No. of Yes Answers) _____

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APPENDIX 2

QUESTIONNAIRE

QUESTIONNAIRE

I. QUESTIONS 1-6 RELATE TO DEMOGRAPHIC CHARACTERISTICS OF THE PARENT(S):

Please check the appropriate answer:

1. a) Age (Mother):
   15-24 ____
   25-34 ____
   35-44 ____
   45-54 ____
   55-64 ____

   b) Age (Father):
   15-24 ____
   25-34 ____
   35-44 ____
   45-54 ____
   55-64 ____

2. a) Race (Mother):
   White (Caucasian) ____
   Black (Negro) ____
   North American Indian ____
   East Indian ____
   Oriental ____
   Other (please specify ____

   b) Race (Father):
   White (Caucasian) ____
   Black (Negro) ____
   North American Indian ____
   East Indian ____
   Oriental ____
   Other (please specify ____

3. a) Marital Status (Mother):
   Single ____
   Married ____
   Divorced ____
   Separated ____
   Widowed ____
   Other (please specify) ____

   b) Marital Status: (Father)
   Single ____
   Married ____
   Divorced ____
   Separated ____
   Widowed ____
   Other (please specify) ____

4. a) How many years of regular schooling have you had? Please circle the number which represents the highest number of years.

Grade School/Junior High	1	2	3	4	5	6	7	8	9
High School	1	2	3						
College	1	2	3	4					
University	1	2	3	4	5	6	7	8	9
Vocational School	1	2	3	4	5				

If you attended college and/or university, what certificate(s), diploma(s), and/or degree(s) were you awarded?

_____

_____

b) How many years of regular schooling has your spouse living with you had? Please circle the number which represents the highest number of years.

Grade School/Junior High	1	2	3	4	5	6	7	8	9
High School	1	2	3						
College	1	2	3	4					
University	1	2	3	4	5	6	7	8	9
Vocational School	1	2	3	4	5				

If he attended college and/or university, what certificate(s), diploma(s), and/or degree(s) was he awarded?

_____

_____

5. Which of the following ranges of income best describes your family income, before taxes?

Less than $4,999 _____
5,000 - 9,999 _____
10,000 - 14,999 _____
15,000 - 19,999 _____
20,000 - 24,999 _____
25,000 - 29,999 _____
30,000 - 49,999 _____
50,000 or more _____

6. Which of the following best describes your family?

   a) One Parent Family _____
      Two Parent Family _____

   b) One Parent Working Outside the Home _____
      Both Parents Working Outside the Home _____

II. QUESTIONS 7-12 RELATE TO CHARACTERISTICS OF THE CHILD.

7. What is the birth-date of the child who was accidentally poisoned?

   _____

8. What is the sex of the child who was accidentally poisoned?

   Male _____
   Female _____

9. a) How many children are presently living with you?

   _____

   b) How many of these children are 1-4 years of age?

   _____

10. Who usually looks after your preschool children during the weekday?

    Their Mother at Home _____
    Their Father at Home _____
    Babysitter in Your Home _____
    Babysitter's home _____
    Day Care Center _____
    Other (please specify) _____

11. Who usually looks after your preschool children during the weekend?

    Their Mother at Home _____
    Their Father at Home _____
    Babysitter in Your Home _____
    Babysitter's home _____
    Day Care Center _____
    Other (please specify) _____

12. a) Have any children in your household swallowed anything in the past that you considered to be poisonous?

Yes ____
No ____

b) When did this occur? _____
(Date)

c) What was swallowed?

_____

III. QUESTIONS 13-15 RELATE TO QUESTIONS ABOUT THE POISONOUS SUBSTANCE:

13. What type of substance did the child swallow?

Prescribed Drug (please specify) _____
Over-the-counter Drug (please specify) _____
Household Product (please specify) _____
Cosmetic (please specify) _____
Other (please specify) _____

14. In what form was the substance?

Liquid _____
Solid _____

15. Where was the substance when the child obtained it?

_____

_____

16. a) Some poisonous substances are stored in child-resistant containers, others are not. Was the poisonous substance that your child ingested kept in a child-resistant container?

Yes ____

No ____

b) If no, in what type of container was the substance kept?

_____

IV. QUESTIONS 17-19 RELATE TO QUESTIONS ABOUT THE STORAGE OF THE POISONOUS SUBSTANCE IN THE HOME:

17. Where did the poisoning accident take place?

Our Home _____
Someone Else's Home (please specify) _____
Elsewhere (please specify) _____

18. Where was the poisonous substance stored in the home?

Kitchen (please specify exact location) _____
Bedroom (please specify exact location) _____
Bathroom (please specify exact location) _____
Basement (please specify exact location) _____
Other (please specify exact location) _____

19. How high above the floor level was the substance stored?

0-2 feet _____
2-4 feet _____
4-6 feet _____
Over 6 feet _____
Not applicable _____
Not known _____

V. QUESTIONS 20-31 RELATE TO EVENTS SURROUNDING AND FOLLOWING THE POISONING ACCIDENT:

20. At what time of day did the accident occur?

Morning (please specify time) _____
Afternoon (please specify time) _____
Evening (please specify time) _____
Night (please specify time) _____

21. During what day of the week did the accident occur?

_____

22. Who was with the child at the the time of the accident?

No one _____
Mother _____
Father _____
Both Mother and Father _____
Grandparent(s) _____
Other (please specify) _____

23. If someone was present, what was the person who was with the child doing at the time of the accident? (For example, cooking, watching television, playing with another child).

_____

_____

24. a) What did the person who was with the child initially do when the accident occurred?

_____

_____

b) Did he/she employ any first-aid measures?

Yes _____
No _____

c) If yes, please specify (for example, was syrup of ipecac given to the child?)

_____

25. Do you have syrup of ipecac in the home?

Yes _____
No _____

26. a) Do you think precautions should be taken before vomiting is induced after a poisonous substance is swallowed?

Yes _____
No _____

b) If yes: What should be done:

_____

_____

27. a) Have you ever received any information on poisons and/or poison prevention?

Yes _____
No _____

b) If yes, where did you get this information?

_____

c) In what form was this information? (Please check one or more).

Pamphlet/Brochure/Information Sheets _____
Lecture/Talk _____
Other (please specify) _____

d) When did you receive this information?

_____

_____

28. With which, if any, of the following symbols are you familiar with?

Cross Bones and Skull _____
Canadian Hazardous Products Symbol _____
"Officer Ugg" _____
"No Siop" _____
None of the above _____
Other (please specify) _____

29. Would you like your child(ren) to be taught about poisons and poisoning?

Yes _____
No _____

30. What do you think your child(ren) needs to know about poisons and poisoning?

_____

_____

31. In what form would you like your child(ren) to receive this poison prevention education? (Please check one or more).

Television Programs _____
Talks on Poisons in Nursery, Day Care, or Play Schools _____
Other (please specify) _____

APPENDIX 3

INFORMED CONSENT FORM

INFORMED CONSENT FORM

Project Title: Accidental Poisoning of Children 1-4 Years of Age: An Exploratory Study

Investigator: Bernice Magee, R.N., B.Sc.N., M.N. Candidate

Project Advisors: Dr. Peggy Anne Field and Dr. Betty Davies

I, _____, freely and voluntarily consent to participate in a study conducted by Bernice Magee, a Master's in Nursing candidate at the University of Alberta, on accidental poisoning of children 1-4 years of age.

I UNDERSTAND that the purpose of this study is to determine the relationship between the developmental level of preschool children in whom poisonings occur, and the common factors present in home situations. Information gained from this investigation may not necessarily benefit me directly but could enable nurses to better educate parents in order to reduce the incidence of accidental poisoning in early childhood.

I UNDERSTAND that I may withdraw my consent and discontinue participation in this study at any time without penalty to me.

I UNDERSTAND that any information collected for this study will be kept confidential and my name and the names of any of my family will not appear in any research report.

I have been given the right to ask, and have had answered, any questions concerning the study.

QUESTIONS HAVE BEEN ANSWERED TO MY SATISFACTION. I HAVE READ AND UNDERSTAND THE CONTENTS OF THIS FORM.

_____ _____

INVESTIGATOR DATE

_____

PARTICIPANT

Please indicate if you would like any feedback from this study:

I would like feedback _____.
I would not like feedback _____.